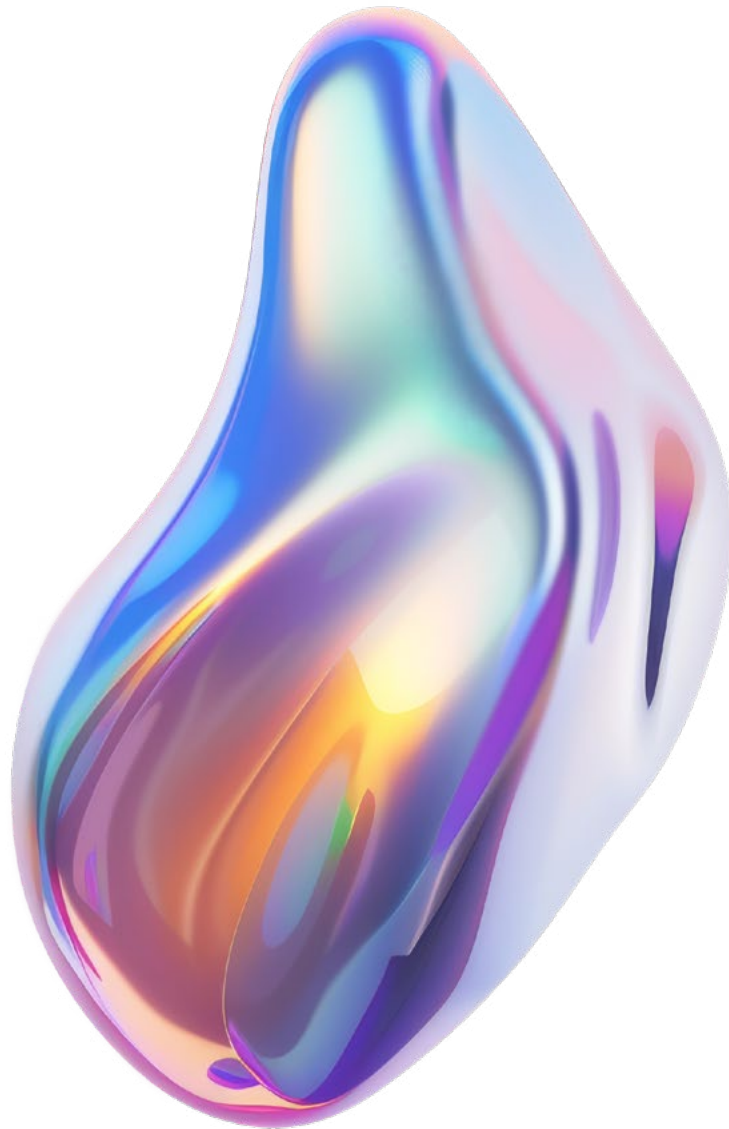


#1

AUTUMN 2024

THE ESSENCE

of HEALTH *and* HUMANITY



JOURNAL OF THE AVOLA DECLARATION ASSOCIATION



My engagement in AVOLA and my devotion to health

With increasing age, my personal interest in stimulating the general and individual interest in health has grown significantly. My professional background is being a dentist and running dental clinical activities. After graduating as a dentist, I began my research training and education for a doctorate, which concerned experimental tissue regeneration. This was followed by specialist training in periodontology (gum disease). A publication from a research group in Helsinki, Finland in 1989 (Mattila et al, BMJ, 1989), which showed the connection between oral health and especially cardiovascular diseases, had a great international impact and also strengthened my interest in the connection between oral health and general health. Over the years, we have since established large patient groups, which enable research and long-term follow-up of the connections between oral health and general health. In particular, we have focused on oral health related to quality of life, cardiovascular diseases, diabetes and excess mortality. The research area is constantly expanding both nationally and internationally. New doors are opened with new knowledge and research methods. Presently, the connection between the microflora of the oral cavity and the microflora of the gastrointestinal tract is receiving particular attention.

In dentistry, it is obvious to involve the patient in order to achieve and maintain good oral health. Against this background, it has also become increasingly interesting and urgent to boost awareness of the possibility of influencing one's own health, not only oral health but health in general.

Through my involvement in AVOLA, I hope to contribute to increased interest and commitment to health. It is important to take advantage of the available evidence and convey this knowledge in a way that creates public and individual interest and participation. We want to combine different areas of research to develop a holistic approach to achieving health. Through AVOLA, we also want to contribute to developing new knowledge to preserve and improve health. It feels urgent to create and develop partnerships with academic and clinical institutions, researchers, health professionals, politicians and the public. The overall aim is to prevent and preclude the occurrence of diseases. Contributing within the framework of AVOLA to increased interest and awareness of health and creating and maintaining health feels like a very urgent focus area. It is indeed also a personal challenge.

Prof. em. Dr. Björn Klinge

Professor em at Karolinska Institutet;
Professor em at Malmö University

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The Spirit of

AVOLA

ETERNUS QUIA PURUS



Marcel J. Scacchi

The Executive Director of AVOLA offers expertise in general and innovation management, and building interdisciplinary networks across the globe. He has been active in the dental, medtech and biotech industry for over 30 years.

Author — Marcel J. Scacchi

“Planning is everything,
a plan is nothing¹”

In 2022, I had a conversation with Ueli Breitschmid, in which he explained the idea and background of setting up an interdisciplinary group that would look beyond oral health to systemic health. His discussions with friends and acquaintances from a wide variety of professions had flared up again and again in recent years. They were sometimes solemnly documented in honorable pamphlets and mutual oaths, but things never really got off the ground. With my background in implant dentistry and the close, years-long collaboration with the ITI, it quickly became clear to me what this was all about and how this idea could be given shape and form. My concept was initially greeted with skepticism: “How is a stranger supposed to know what we have been brooding about internally for a long time?” This is what insiders probably whispered behind my back...

¹ Dwight D. Eisenhower

But I did not hesitate for long: I needed financing, a balanced and competent board, a structure, and clarity about what, how, when, and with whom. In other words, a concept. A lot of things that had previously existed only in some people’s heads were now put on paper and became concrete. By continuously increasing communication with stakeholders to gain support, the AVOLA virus slowly but surely began to infect me, too!

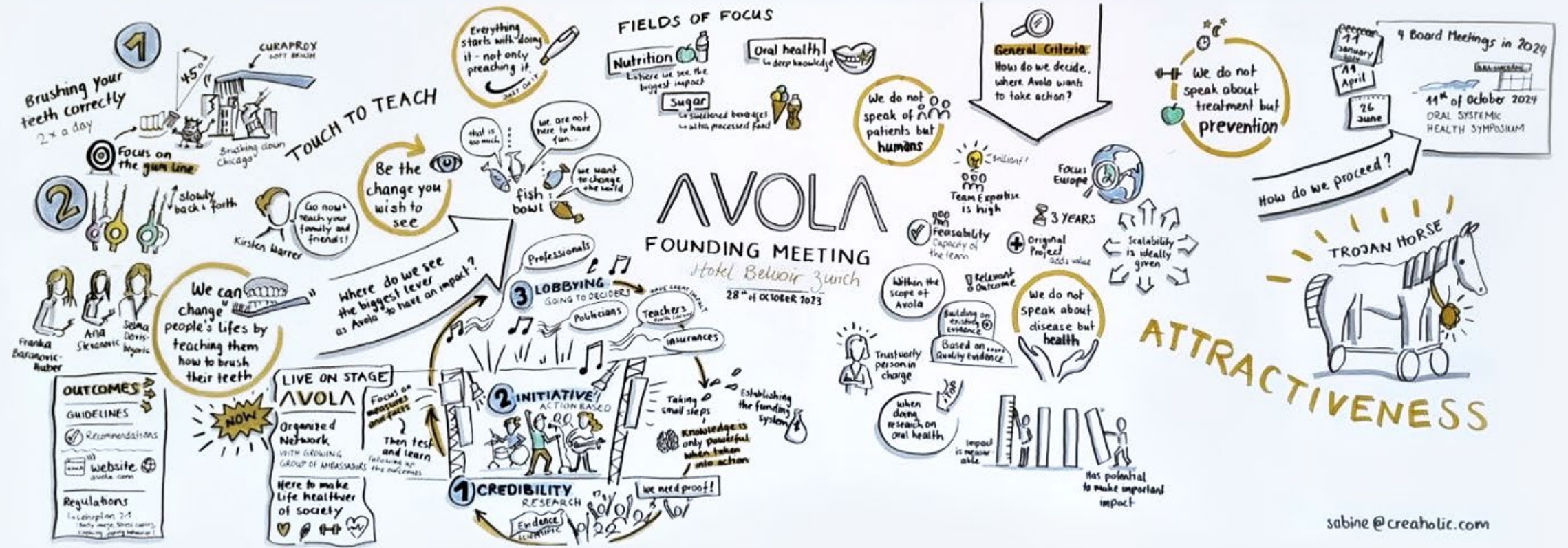
It must become a mission or even an obsession to believe that health promotion and prevention can change the world. But it is sorely necessary that something changes here and, fortunately, we are noticing that more and more people understand that our current health systems primarily based on illness and its treatment are leading to a dead end.

There is no health without oral health

Oral health has been relegated to the shadows for years. Such neglect is surprising given that almost half of the world's population – close to 3,5 billion people – suffer from oral diseases. Globally, the number of patients with oral diseases outstrips the total number of patients with the five most prevalent non-communicable diseases (NCDs), such as mental illness, cardiovascular disease, diabetes mellitus, chronic respiratory disease and cancer, by almost 1 billion.

It has long been scientifically proven that oral health has a key influence on our general health. What's more, it influences our physical, psychological, and social well-being. But there is not enough awareness among the population, so there is a lot to do!

The founding meeting from October 27th to October 28th, 2023, quickly demonstrated this. Experts must meet and exchange ideas more frequently to make their findings and experiences accessible to further develop the topic in a holistic context and to find new answers.



An important part of the founding myth: the thought model of the AVOLA movement graphically and creatively realised.

AVOLA is committed to health and humanity. By enhancing prevention, we envision a world with a healthy life for everybody.

We all want a healthy life – we are all AVOLA

AVOLA is a multidisciplinary, independent, and politically active network of professionals in healthcare and related disciplines. Amongst other topics, we are focused on oral health as the gateway to the human body and the microbiome as the interface to its environment. We choose to work with partners, who help leverage our actions and increase our impact. We promote targeted translation from bench to community, thereby creating value for society.

AVOLA provides multichannel evidence-based information and education on disease prevention and health promotion. We empower people to increase control over their health through health literacy efforts and multisectoral action to amplify healthy ways of life. As a result of our continuous efforts, healthcare costs will be reduced, and people will live a healthier and happier life.

Join us, become part of a global movement, and help other people lead healthier lives. Become a member of AVOLA: JOIN FOR SCIENCE – STAY FOR FRIENDSHIP.



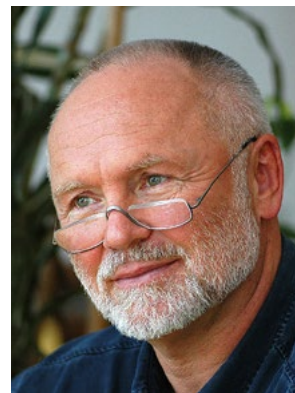


Founding meeting from October 27th to October 28th, 2023

Front row from left to right: Christine Breitschmid; Denis Bourgeois; Kirsten Warrer; Ana Stevanovic.
 Back row from left to right: Marcel J. Scacchi; Bruno Affentranger; David Fäh; Selma Dervisbegovic;
 Bo Danielsen; Björn Bartling; Björn Klinge; Ueli Breitschmid; Franka Baranovic-Huber

The key moment

The key moment in the development of Ueli Breitschmid’s company Curaden was when he met Dr Jiří Sedelmayer, who became a mentor for Ueli Breitschmid. The two shared a deep friendship and a common understanding of the topics of prophylaxis, dental and oral hygiene. The claim “health starts in the mouth” became the guiding principle of the iTOP prevention programme developed by Sedelmayer, which Curaden uses to teach dental professionals around the world how to brush their teeth effectively using the appropriate techniques and products. As a pioneer, Sedelmayer has developed three criteria to determine the quality of oral hygiene techniques and products: Effectiveness, acceptance and atraumatic application. Preventive oral health through personal responsibility has characterised the company culture for decades. This is modern thinking and is consistently implemented by Curaden.



Jiří Sedelmayer (1946–2019)

Jiří Sedelmayer was a Czech dentist, university teacher and researcher. He studied and taught dentistry at the University of Hamburg. Sedelmayer was a founder of the Czech Preventive Society, New School of Individual Prophylaxis and the Individually Trained Prophylaxis (iTOP) programme. In his practice and research he focused on individual prophylaxis, filling therapy and endodontics.

Jiří Sedelmayer and his wife Lucie trained thousands of dentists and hundreds of iTOP teachers from Japan, Russia, the US, Canada, South America, Vietnam, China, Australia and the whole of Europe. In total, Sedelmayer certified around 100 instructors, who continue to convey his messages worldwide and teach his methods. He participated in developing a new generation of interdental brushes and toothbrushes.

Be part of our community and advance your professional and social experience. Get on top of your game through lifelong learning with the help of our education opportunities. Leverage our vibrant community of experts through education and social activities.



EXPAND YOUR NETWORK

Access a unique network offering various and exciting activities.



ACCESS TO RESOURCES

Funds are available for clinical documentation or educational projects; grants are available for young professionals (scholarships).



CONTRIBUTION TO SOCIETY

Enjoy your intrinsic motivation to contribute to a better and healthier society.



ADVANCE YOUR COMPETENCIES

Build your reputation with patients and peers: as a researcher, a scientist, a clinician, a speaker, a teacher or an innovator.

Ueli Breitschmid – man on a mission

Authors — Bruno Affentranger and Angel Gonzalo

Better oral health for everyone – good health starts in the mouth. This is the goal Curaden has set itself. The Swiss company has the products, methods and knowledge to achieve better oral health. At the heart of it all is Ueli Breitschmid, owner and representative of the second generation of the family business and spiritus rector of the AVOLA movement. And he is driven by a very particular motivation.



Ueli Breitschmid

The Lucerne company Curaden has made a global name for itself with dental care solutions. Behind this success story stands the Swiss entrepreneur Ueli Breitschmid, who has elevated his father's work to the level of 'comprehensive oral health'.

is about and how it works. I basically want to understand things.” This may sound exhausting, but for Ueli Breitschmid it is a precondition for the company and its workforce to keep improving. The entrepreneur is consciously forging his own path: supported not just by his own agility or company history with almost seventy years of tradition, but above all through intelligent linking and knowledge transfer. This is unusual in an industry that has primarily focused on volume sales.

Prevention first and foremost

One vision has driven Ueli Breitschmid right from the start: he wants prevention to play a more important and larger role in the healthcare sector. The aim is to train specialists and dentists, but also doctors, nursing staff, behavioural economists and many others accordingly. In Ueli Breitschmid's healthier world, there is little room for so-called “repair medicine”. Prevention is everything. This joined-up way of thinking is only just starting to catch on. Entire societies want to restructure their healthcare systems in such a way that prevention efforts no longer languish in single-digit percentage figures; ideally boosting their share to half of total healthcare expenditure. They are all a long way from achieving this. But Ueli Breitschmid is not one to back down.

A network of interests – all serving each other

It is no wonder that Ueli Breitschmid's world brings together and intermeshes much more than we expect from conventional entrepreneurs. Together with his daughter Christine and an over 900-strong team, he has built up a net-

“I believe in a better world. And we can create it – it's in our own hands,” says Ueli Breitschmid, owner of Curaden AG, which operates in more than ninety countries worldwide. So it comes as no surprise that the oral hygiene company sells more than just products and services: spreading the word on how to maintain a healthy mouth for life is just as important to Ueli Breitschmid. Because this is the crux of the matter: we all have it in our own hands to look after ourselves and our health. Ueli Breitschmid and many scientists around the world are convinced that systemic health begins in the mouth. After all, the mouth is the gateway to the body. Practising good oral hygiene benefits the microbiome and ultimately makes for a healthy person.

The well-connected entrepreneur is pursuing the vision of a healthier world. A world in which dedicated dental professionals, educated consumers and attractive, effective and safe products using simple methods work hand in hand to promote oral health. A world in which oral health makes a vital contribution to our happiness and well-being.

Driven by an inquisitive mind

Ueli Breitschmid's approach to work and thinking has been very much his own since he joined the business at the end of the 1960s. He doubts and questions everything. Nothing is certain. Nothing is left unexamined. “There is no single truth,” he says. “That's why I always want to know what something

work of methods, products, brands and companies. These include mechanical, chemical and electrical products as well as knowledge transfer and corresponding motivation and support programs.

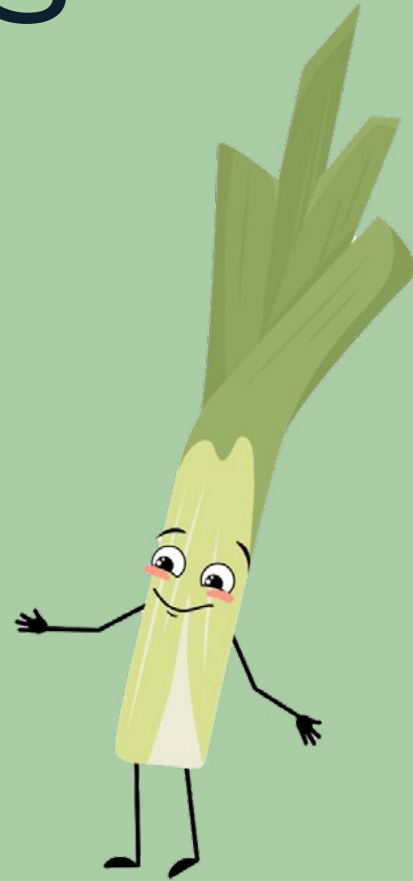
Changing the world

More surprising is the sense of mission that Ueli Breitschmid embodies and with which he continues to grow the business founded by his father. He strives to make the world a better place – by improving health. His approach is holistic. Knowledge transfer through dental training programs such as iTOP or his commitment to an interdisciplinary approach, as espoused by the AVOLA ASSOCIATION.

His world is not the finished article. Companies and ventures grow organically as opportunities allow. One thing leads to another. While in hindsight it may all seem like a grand plan, in reality it is a reflection of his life: random, full of contradictions, the result of persistent probing and a way of thinking that is reviewed and reformulated on a daily basis – a radical approach! Because belief alone is not enough for this entrepreneur: he wants to understand and, if in doubt, do everything differently to others. His curiosity spurs him on and pushes him further. He is troubled, for instance, by the question of why prevention still does not command the status in society that our health deserves. And it doesn't stop with questioning alone: Ueli Breitschmid is a doer who encourages others to take action too. His motto is that we all have a lot more potential than we give ourselves credit for. We need to have ideas and follow them through. True to the saying: “I am what I think.” Ueli Breitschmid never stops thinking and taking action.

“I believe in a better world. And we can create it – it's in our own hands.”

How better conditions help us achieve a healthier diet



David Faeh

Professor for Nutrition (BFH)
& Prevention (UZH)

Author — David Faeh

Nutrition plays a key role when it comes to health. How healthily we eat depends essentially on the conditions that determine our eating behaviour. This behaviour is in turn strongly influenced by the environment in which we live. Unfortunately, the political will to introduce structural and effective measures in the area of nutrition is chronically weak.

Let's start with some good news: we are getting older and older. In Switzerland, life expectancy is over 85 years for women and over 81 years for men. So prevention does work? In order to judge, we would need to look at information on newly occurring disease and the health of the population in addition to information on mortality. And this paints a different picture – as far as can be gauged from the scant data available. In contrast to life expectancy, the age to which we can expect to live a healthy life has remained stable, at around 70, for decades (see Figure 1). In fact, in Switzerland we spend only half the period between retirement and death without health impairments. In countries such as Sweden and Norway, this healthy time span is over 70% of time spent in retirement. The bottom line from these figures is that the Swiss population is only growing as old as it is because people are kept from dying for longer than in other countries. Its efficient but increasingly expensive healthcare system means that Switzerland is good at keeping sick people alive for a long time. However, the country does a miserable job when it comes to preventing healthy people from becoming ill.

Non-communicable diseases on the rise

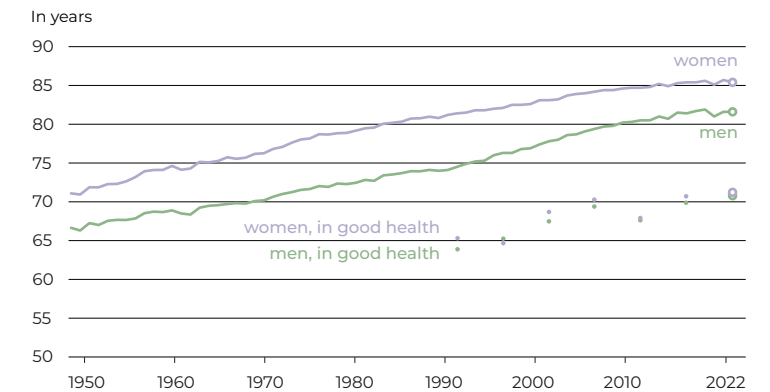
A combination of an ageing population and neglected prevention is leading to more and more people suffering from chronic non-communicable diseases (NCDs). In Switzerland, over a third of the population suffers from cancer, cardiovascular diseases, diabetes and respiratory diseases. If chronic mental illness, musculoskeletal diseases and dementia are added to these typical NCDs, chronic diseases account for more than half of the population and 90% of deaths. In Switzerland, people have to become ill before they can benefit from insurance-covered healthcare services. For example, health insurance only covers the cost of nutrition counselling once a person has reached a certain obesity threshold. The healthcare system is therefore unsuitable for

reducing the number of people affected by NCDs and the burden of disease on the population. We can only find a way out of this NCD pandemic if we make sustainable changes to the conditions in which we live, e.g. by adapting the laws that regulate, for instance, the composition, presentation and advertising of food or the choice in the gastronomy trade. Exercise on foot or by bicycle should also be increasingly and

Let's start with some good news: we are getting older and older.

FIGURE 1

Life expectancy and healthy life expectancy at birth, Switzerland, 2024



The 2012 data relating to healthy life expectancy are not directly comparable with those from other years because of a change in the answer modalities concerning self-perceived health.

Data as on: 31.01.2024
Source: FSO – BEVNAT, ESPOP, STATPOP and SHS

systematically promoted at the expense of motorised private transport.

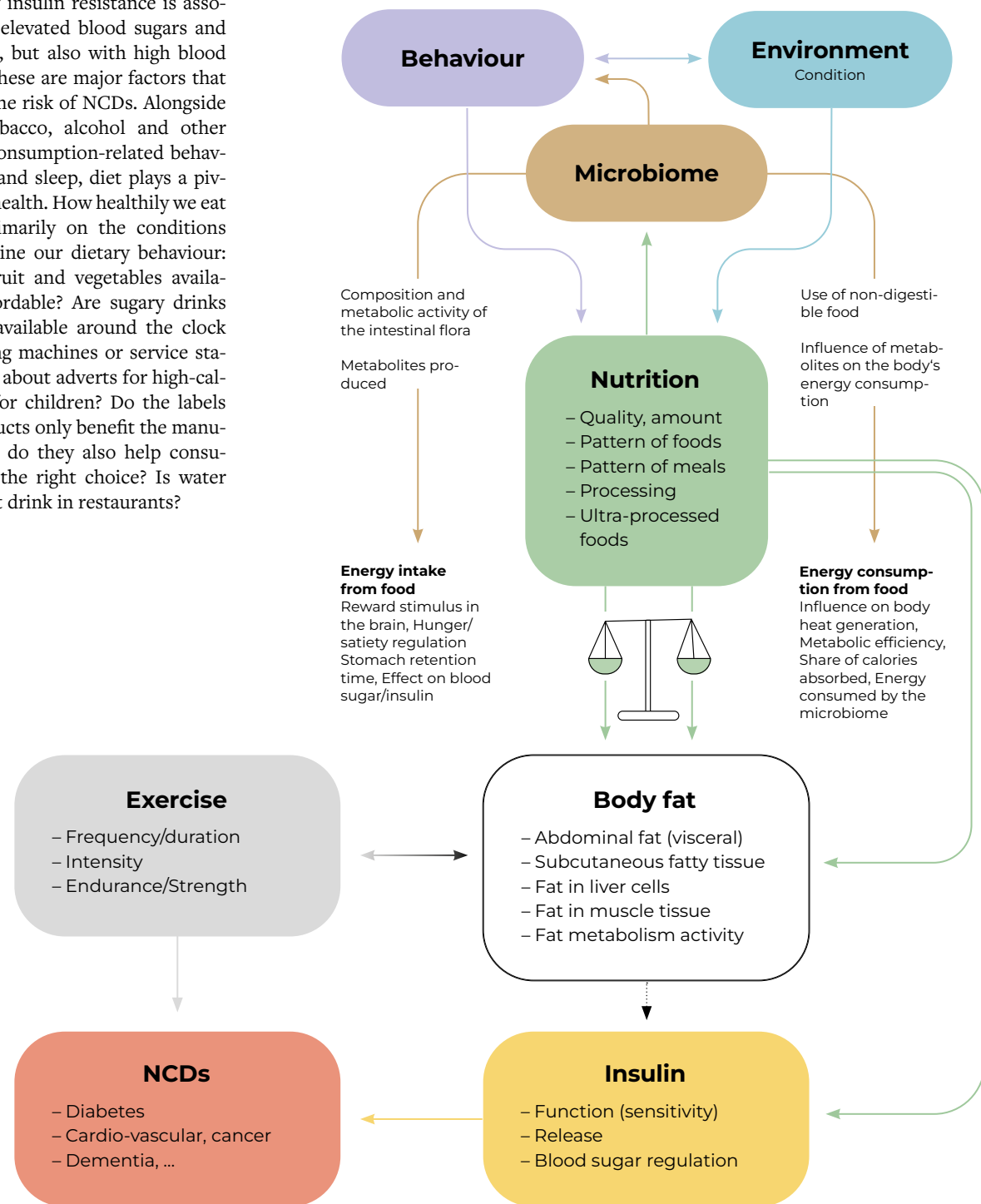
Causes and consequences of our nutrition

What and how much we eat is strongly influenced by the environment in which we live (see Figure 2). Food regulations, the retail trade, advertising, (dis)information through (social) media and influencers, farming, our food culture, price, attractiveness and availability of food, but also education: All these factors and many more define our behaviour, which is usually hidden unconsciously behind daily routines. The type and processing of food dictates when we stop eating and when we feel the need for another meal – either directly via our digestive system or indirectly via the microbiome. Our microbiome determines our energy balance. A positive energy balance results in an energy surplus, which the body stores

in the form of fat, be it in the subcutaneous depots, in the abdomen or in organ cells such as the liver and muscles. This fat can trigger chronic inflammation in the body and affect the function of the key metabolic hormone insulin. In most cases, this interferes with the hormone's ability to lower blood sugar. This type of insulin resistance is associated with elevated blood sugars and blood lipids, but also with high blood pressure – these are major factors that determine the risk of NCDs. Alongside exercise, tobacco, alcohol and other substance consumption-related behaviour, stress and sleep, diet plays a pivotal role in health. How healthily we eat depends primarily on the conditions that determine our dietary behaviour: Are fresh fruit and vegetables available and affordable? Are sugary drinks cheap and available around the clock from vending machines or service stations? What about adverts for high-calorie foods for children? Do the labels on the products only benefit the manufacturers or do they also help consumers make the right choice? Is water the cheapest drink in restaurants?

FIGURE 2

Nutrition: Influencing factors and health consequences



Inspiring analogy to road safety

If we want prevention to have a lasting effect, we need to change the conditions we live in. Measures taken to improve road safety show that this approach is very effective (see Table 1).

Between 1970 and 2017, the number of road traffic fatalities fell from 1,750 to 250 per year, even though the number of vehicles doubled (see Figure 3). Comparable measures could be implemented and applied to nutrition, as the examples in Table 2 demonstrate. To date, they have only been implemented very hesitantly, if at all – even though in Switzerland not 250, but over 55,000 people die of NCDs every year. However, the images of chronic diseases and ‘silent’ deaths are far less dramatic than those of road traffic injuries and fatalities. This may well be one reason why the political will for structural meas-

ures in the area of nutrition is chronically weak. Opposition due to conflicts of interest, e.g. of an economic nature, is also conceivable. This would also explain why Switzerland is at the bottom of the class in Europe when it comes to tobacco prevention. One of the consequences are very high international

rates of lung cancer, especially among women. Especially in a direct democracy like ours, it falls on us to pave the way for our children and grandchildren to grow up in an environment that not only allows them to lead a long life, but also one that is free of health problems and worth living.

Alongside exercise, tobacco, alcohol and other substance consumption-related behaviour, stress and sleep, diet plays a pivotal role in health.

TABLE 1

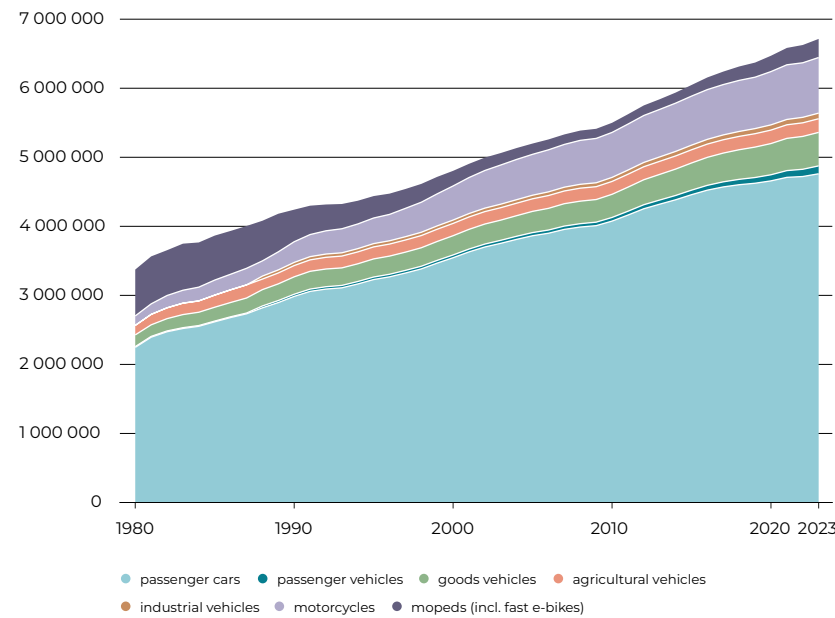
Planned and implemented structural prevention measures in road traffic

Driver «Consumer»	Road «Environment»	Vehicle «Product»	Culture «Attitude»
<ul style="list-style-type: none"> - Raising awareness / education, e.g. in kindergartens / schools - Licensing / test of capability - Age limit for driving permit - Fines (mobile phone at the wheel, speeding, alcohol/drugs, red light...) - For offences: vehicle seizure, prison 	<ul style="list-style-type: none"> - Surface, road- and traffic routing - Lighting, safe railway crossings - Road maintenance / clearing - Speed limits - Road signage, traffic lights - Separate cycle lanes, separate traffic lights - Car-free zones, 30 km/h zones 	<ul style="list-style-type: none"> - Active safety: automatic emergency braking, fatigue detection system, alcohol interlock device, speed and blind spot assistant, ... - Passive safety: seatbelts, child safety seat, airbags, pedestrian protection, helmet - Safety standards (e.g. European standard), tested with crash tests - Periodic motor vehicle inspections - Servicing as per manufacturer's specifications 	<ul style="list-style-type: none"> - Approach to drink-driving - Citizens' initiatives, such as 'Nez Rouge' - Attitudes towards speeding drivers - Views in terms of the maximum speed limit - Prioritisation of non-motorised traffic (pedestrians, cyclists) - Wearing a bicycle helmet = the 'norm' - Acceptance of restrictions on motorised traffic (e.g. driving ban or tolls) - Car-free city centres and residential streets are becoming increasingly feasible

FIGURE 3

Vehicle stock and fatal road accidents in Switzerland

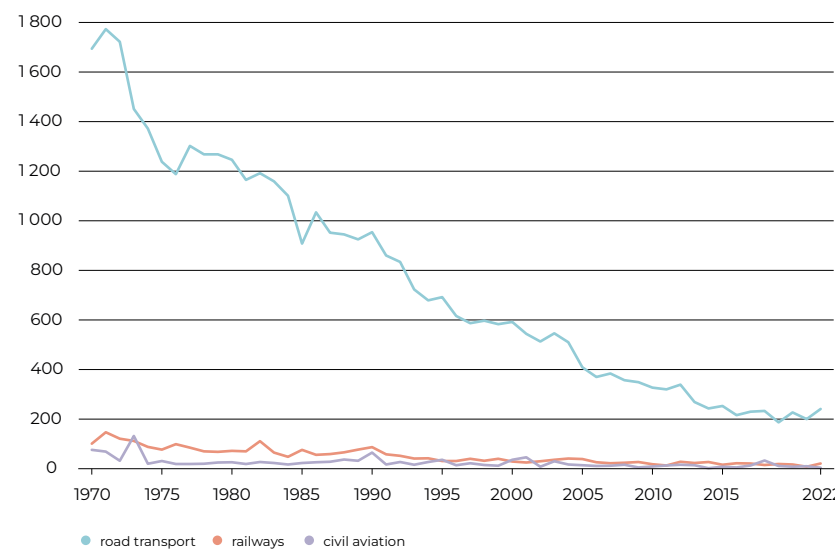
Stock of road motor vehicles



Source: FSO – Moped survey, conducted by the cantons; FSO, FEDRO – Stock of road vehicles (MFZ) © FSO 2024

FIGURE 4

Fatally injured persons by transport mode



Sources: FEDRO, FSO – Road accidents (SUV); FOT – National occurrence database; STSB – Aviation accident statistics © FSO 2023

TABLE 2

Possible structural measures in the area of nutrition

General population
«Consumer»

- Improve nutritional competence, e.g. by adapting the curriculum
- More competence in terms of self-growing & processing food
- Raising awareness of 'externally controlled' purchasing
- (Social) media use
- Promoting physical activity: day-to-day exercise

Conditions
«Environment»

- Restrictions on advertising, especially targeting children and young people
- Regulating vending machines and 24-hour stores
- Requirements for restaurants/retailers, e.g. regarding offering, portion sizes, availability, transparency, pricing
- Reshaping: construction, social, political environment
- A more people-friendly working environment to reduce stress and improve sleep

Food
«Product»

- Stricter requirements regarding claims, labelling & design of products
- Adaptation of the Foodstuffs Act: definitions of nutrients such as 'sugar', specifications for recipes & processing
- Retail trade: presentation & availability of foods
- Guidelines for communal catering, particularly in schools, restaurants (e.g. price of water)
- Steering via taxes & subsidies, e.g. different VAT rates

Culture
«Attitude»

- Recognising obesity as a disease
- Taking more account of social inequality
- A more critical attitude towards diet offerings & products, fast food
- Outlawing non-transparent political lobbying and the concealment of conflicts of interest
- Raising awareness of products that 'dazzle' & misleading claims/labelling on products
- Appreciation of non-motorised traffic, green zones, sustainable, seasonal / regional production, 'real food', the 'true' cost of food...

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The microbiome, an interfacial relationship between general and oral health

Authors — Prof. Ulrich P. Saxer, Dr. René B. A. Sanderink and Dr. Gail E. Steimer

Decades of recognition underscore the critical importance of optimal dental care for sustaining oral health. The interplay between diseases like dental caries, periodontitis, and peri-implant inflammation, and their impact on overall health, has been a concern for over seventy years. This connection, driven by systemic dissemination of pathogens from oral biofilms, disturbed homeostasis, and inflammatory mediators, underscores a significant relationship between oral and systemic health. With tooth loss statistically linked to life expectancy, addressing orointestinal dysbioses and promoting immune homeostasis becomes paramount in preventing non-communicable diseases. Enhanced interdisciplinary collaboration between dentists and physicians is essential for achieving this goal, thereby ushering in a new era of preventive healthcare.

Since many decades it has been widely recognized that establishment of optimal dental care is of paramount importance for guiding and maintaining oral health. The relationship between diseases relating to oral biofilm such as dental caries, periodontitis and, more recently, peri-implant inflammation and moreover, the relating reciprocal impact relevant to diseased states pertaining to remote organs, have been of concern to medicine for more than seventy years [1].

The connection between oral and systemic diseases is based on systemic dissemination of pathogens stemming from oral biofilms (via haematogenous, oro-digestive, oro-pharyngeal routes and even by neuroinvasion), a disturbed redox- and cytokine homeostasis (including cytokinemia and other inflammatory mediators present in circulation), the myelopoiesis training status of bone marrow, age-related progressive accumulation of harmful biomolecules in the body and gene regulatory changes. These are all factors in a process leading to progressive damage in functionality of the human body resulting from an aging-related constitutive, bodily total inflammatory burden (referred to as systemic chronic inflammation, SCI), summarized under an umbrella term “inflammaging”.

Statistically, there is a significant connection between tooth loss and life expectancy. Increased mortality rates have been reported in patients with severe periodontitis. A crucial correlation in this regard is the state of the orointestinal microbiota consisting of a total of 20 trillion microorganisms essentially encompassing a bacteriome, a mycobiome and a virome (including a phageome). It is important to distinguish between microbiota and microbiome. Microbiome is defined as the entirety of genetic material of vital and non-vital parts of the microbiota (including subcellular particles) within a specific environment, e.g. the orointestinal tract. Accordingly, the microbiota is an assemblage of microbes and the microbiome is a repertory of genetic material.

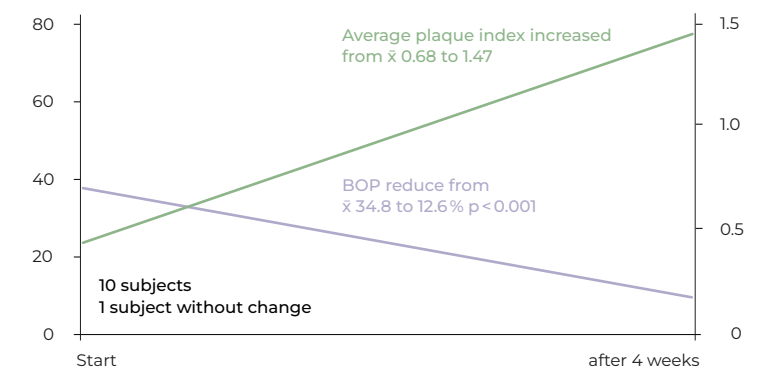
The microbiota should be in balance in terms of composition, species diversity and gene richness, thus promoting immune homeostasis and neurohomeostasis, extremely crucial for prevention of non-communicable diseases (NCD). The developmental and functional framework is nature-given through co-evolution of orointestinal tract, enteric nervous system, mucosal immune system and microbiota in circumstance peaceful over many millennia, due to presence of enormous numbers of immune cells and neurons in the intestinal wall. Resulting host-microbe evolutionary interactions were as follows:

1. a reactive situation of the immune system characterized by physiological tolerance (toward harmless environmental stimuli and the body's own macromolecules (Fig. 5).
2. appropriate, sophisticated mechanisms for effective elimination of infectious and sterile noxious agents.

However, since the beginning of the industrial revolution, the entirety of all non-genetic, endogenous and exogenous environmental influences to which an individual is exposed throughout lifetime, the so-called exposome, has undergone sudden and drastic changes. This has led to the loss of numerous symbiotic microbial species (our “old friends”) resident in most all humans just a hundred years ago, and in many cases the microbiota has also adopted a dysbiotic state, promoting loss of immunological tolerance and increase in systemic chronic inflammation (SCI). Other pathogenic factors of the modern lifestyle exposome also contribute to orointestinal dysbioses, which represent a basic etiological evil of modernity. One of the etiologic evils are xenobiotics present in environmental toxins, drugs (including vaccines and their adjuvants), biomaterials, nutritional noxious substances (including excessive consumption of refined sugars and fats, as well as food additives) and addictive substances (such as alcohol and nicotine).

FIGURE 1

Live as in the Stone Age – Swiss television, 2007
Inflammation index (BoP) & plaque index without oral care



The scientifically supported Swiss television program in 2007 followed ten people who lived as if they were in the Stone Age and, despite abstinence from hygiene, after four weeks they unexpectedly had healthier gums and fewer aggressive bacteria despite higher accumulations of dental plaque. The connections are shown in the book: Oral Preventive Medicine by Sanderink/Renggli/Saxer [3].

Source: Baumgartner, Imfeld & Persson et al., J Periodontol (2009)

Experiment with “Stone Age Nutrition”

In 2007, a Swiss television program entitled “Living as in the Stone Age” scientifically supported by the Universities of Bern and Zurich presented astonishing discoveries. The study encompassed ten test subjects who were not allowed to clean their teeth with the usual hygiene products for four weeks. The study design resembled the end of a “Stone Age period” comprising, as far as possible, no immunogenic factors of the modern exposome. All subjects were given “Stone-age nutrition” in an environment without modern everyday life stress, which demonstrated stunning results including significantly less inflamed gums and, in comparison to the previous microbiotic burden, a significant reduction in pathogens (Fig. 1) [2].

Statistically, there is a significant connection between tooth loss and life expectancy.

At the time, these results were almost incomprehensible. Subsequent international research projects revealed circumstances in caries and periodontitis, where very high numbers of pathogens from dysbiotic oral microbiota were swallowed in large quantities, especially during main meals (Schmidt et al. 2019) [4]. For example, 1 ml of saliva from a patient with severe periodontal disease possibly contains more than 10⁶ colony-forming units of the inflammatory pathobiont *Porphyromonas gingivalis*. In fact, subjects suffering from periodontal disease swallow 10⁸–10¹⁰ of these keystone pathogens, being characterized as capable of exerting pathogenic effects even in very small quantities.

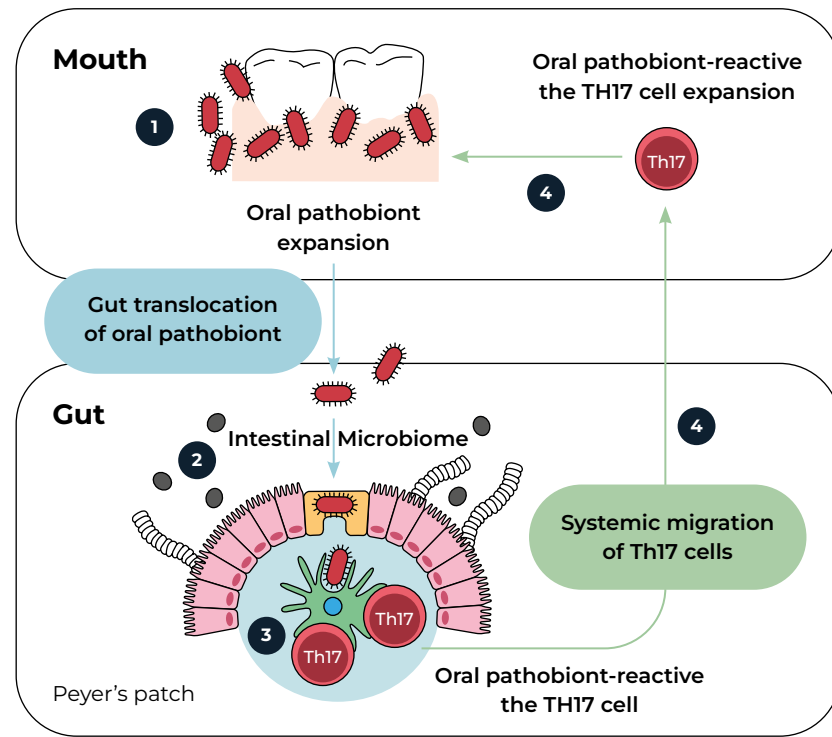
Microbes swallowed survive a temporary increase in pH values in the stomach - immediately after a meal values are approximately pH 5 - and also resist antimicrobial bile acids in the duodenum. Upon further voyage into the intestinal tract, microbes become operational “dysbiotics”, contributing to a loss in microbial homeostasis. Orointestinal dysbiosis results in a pathological increase in permeability of mucous membranes and periodontal/periimplant epithelial tissues conferring a transfer of microbes including their virulence factors into lymphatic and blood vessels. Finally, a predominantly gram-negative, dormant blood microbiome with endotoxemia can be established, representing an immunogenic trigger factor (Fig. 2). Moreover, in Peyer’s patches oral pathogens elicit the differentiation of naïve T cells into proinflammatory T-helper cells which, in turn, migrate per hematogenem into the mouth, thereby promoting inflammation of periodontal tissues (Nagao et al. 2022) [5].

In addition to food, swallowed bacteria and oral antibiotics, endogenous factors of the exposome, such as psychological influences and stress (the latter via the so-called gut-brain axis, DHA) can have a significant impact on the orointestinal microbiota and thus

on immunity, including development of NCD and also on health, in general. Conversely, intestinal dysbiosis disrupts the DHA-homeostasis, which may elicit behavioral changes, cognitive impairment and altered pain perception (Fig. 3).

FIGURE 2

Development of severe periodontitis via Gastro Intestinal Tract (GIT)



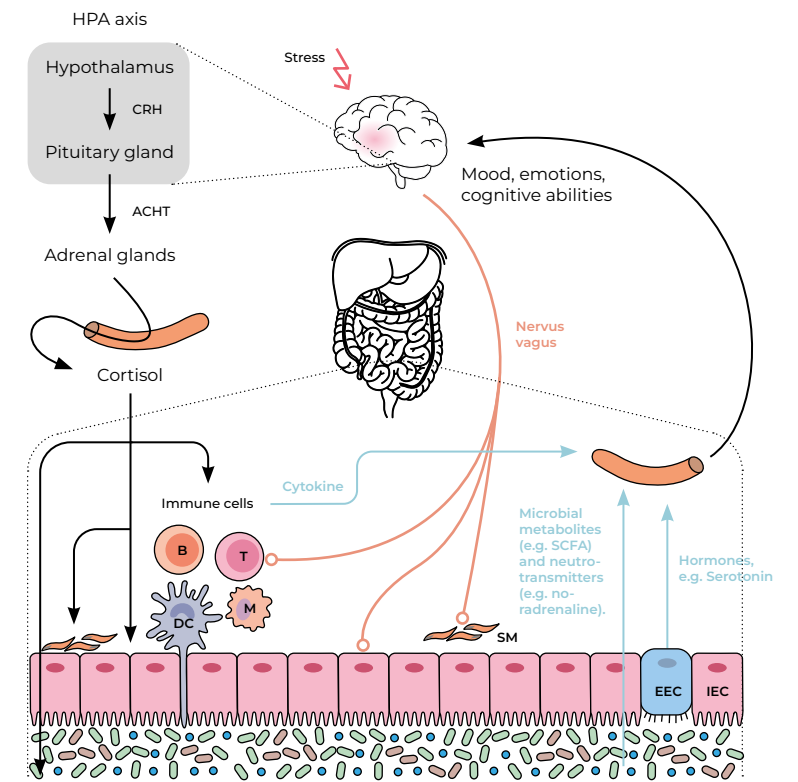
In the event of an infection (Dysbiosis) the Th17 cells (helper lymphocytes) move from the gut to the mouth and worsen the periodontitis.

***Porphyromonas gingivalis* (Pg) penetrate the intestine, where they activate proinflammatory Th17 helper cells, which in turn are transported via the bloodstream into the periodontal tissues where they aggravate inflammation.**

Fig. Summary, Nagao, Kishikawa, Tanaka et al. Bioscience / Cell Press, 2022

FIGURE 3

Bidirectional communication between the gut and the brain



Bidirectional communication between the gut and the brain (gut-brain axis= GBA). This simplified representation demonstrates neuronal connections (mainly via N. vagus X) and humoral communication pathways (hormones, immunological messengers, neurotransmitters).

ACTH = adrenocorticotropic hormone; B = B lymphocyte; CRH = corticotropin-releasing hormone; DC = dendritic cell; EEC = enteroendocrine cell; SM = smooth muscle; HPA axis = hypothalamic-pituitary-adrenal axis; IEC = intestinal epithelial cell; M = macrophage; SCFA = short chain fatty acids; T = T lymphocyte.

Image: R.B.A. Sanderink

P. gingivalis also perturbs innate immune responses, thereby significantly increasing their survival in infected tissues. Thus it is not surprising that *Porphyromonas gingivalis* (Pg) is frequently detected as a dominant pathobiont in a wide variety of sites throughout the body, such as arteriosclerotic vessels, infected joints and rheumatoid arthritis; *P. gingivalis* is also overall predominant in obese constitutions. Pg leads to impairment of glucose metabolism through disruption of insulin signaling pathways (thus decreasing insulin sensitivity), induces hypofunction of pancreatic beta-cells and reduction in specific cell population and accordingly, contributes to insulin resistance, as precursor of diabetes. Even fetal tissue becomes adversely affected by this pathogen. Based on these findings, it is also clear why this KEYSTONE pathogen was named *P. gingivalis*, as its pathology was discovered by oral microbiologists early in the 1980s. However, the *bacterium* not only develops its pathogenic potential in periodontia, but also destroys other tissue structures.

Statistically, there is a significant connection between tooth loss and life expectancy.

Interdisciplinary collaboration

Conjecturing a future professional medical environment, medical disciplines must be viewed holistically, and the mouth must be “put back into the body”. Therefore, the next challenge absolutely necessary for implementation is an intensified interdisciplinary exchange between dentists and physicians. This collaboration also affects psychiatrists, psychologists, educators, coaches, managers and, in short, everyone who takes on responsibility for human beings [3].

The most important clinical task is to establish microbiomes with dysbiosis-resistant phenotypes in future

offspring through structured collaboration, particularly between dentists, gynecologists, general practitioners and internists. Having this main goal in mind, an interdisciplinary cooperation should be initiated and established during the perinatal period, from the beginning of pregnancy up to one year post-partum. One example to illustrate positive outcome: After a perinatal intake of probiotics, a good immune defence remains observable in these offspring decades later, especially in the form of a dysbiosis-resistant indigenous microbiota. When pregnant women take probiotics during the perinatal period and, accordingly, newborns receive mother’s breastmilk and also pro-

biotics through administration during the first year of life, a reduction in incidence of caries of over 50%, gingivitis of over 40% in children aged 10 years could be registered (Fig. 4). In addition, eubiotic orointestinal microbiomes promote better physiological development of nervous system and immune system combined, in childhood. For general medicine, this means a significant elimination and/or reversal of SCI, lowering clinical susceptibility to non-communicable chronic inflammatory diseases such as cardiometabolic and neurodegenerative diseases, autoimmune diseases, cancer, allergies, and even psychological disorders [3,7].

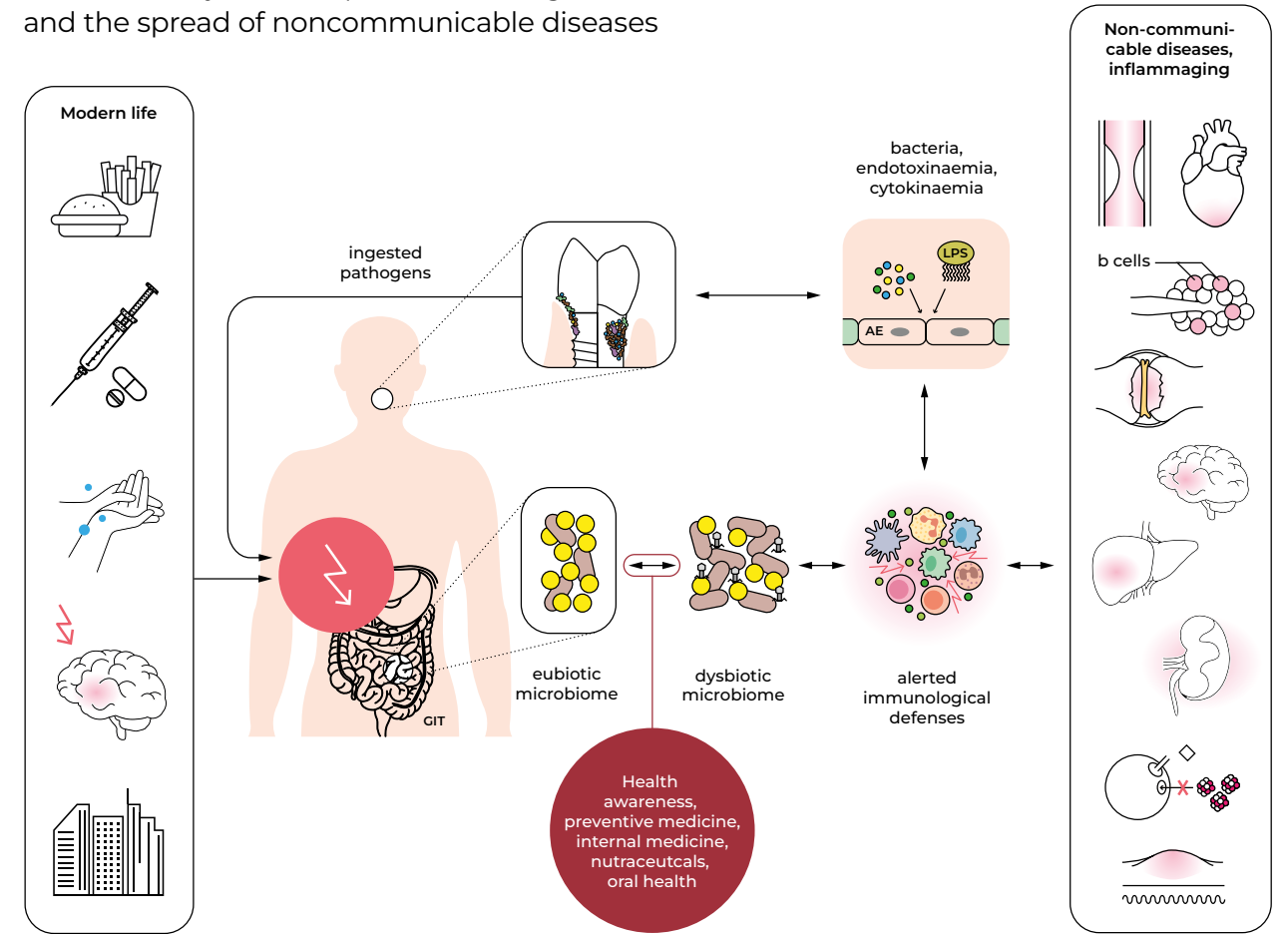
The role of the dental clinician is very special in that they are medical professionals uniquely, for the most part, seeing a majority of the population for a regular, once a year check-up. In this respect, regular monitoring of the development of each patient case history, documentation of oral microbiome homeostasis while, as far as possible, employing noninvasive interventions to evade an increase in xenobiotic burden. Hereby, the dental clinician is capable of early recognition, detecting signs of NCD, such as gingival inflammation, oncoming obesity or dementia, which should subsequently be referred to a family doctor, psychiatrist, etc. to reverse the course of NCD (Fig 5).

Summary and recommendation

During the past fifty years the dental profession has succeeded worldwide in many fields of oral prevention, medical and technical, especially caries, periodontitis and oral NCDs. Since this achievement in dentistry, it should be plausible that equal success also be stowed upon the population also achievable in medical matters, NCDs such as diabetes, autoimmune diseases, arteriosclerosis, cardiopathy, related circulatory diseases, neurodegenerative diseases (Alzheimer’s & Parkinson’s) and mental disorders (such as autism) through increased interdisciplinary collaboration. However, this also requires changes in university curricula and professional networks. Political authorities, health economists, educators, nutritionists and superiors are also on call for duty.

FIGURE 5

Modern lifestyle consequences relating to the microbiome and the spread of noncommunicable diseases



Graphical summary of the book content [3,7]. The relationships between today’s life, the occurrence of NCD, SCI and inflammaging are depicted, as well as the role that the microbiome, the immune system and the nervous system play here. Curative and preventive interventions require interdisciplinary collaboration between oral medicine and general medicine.

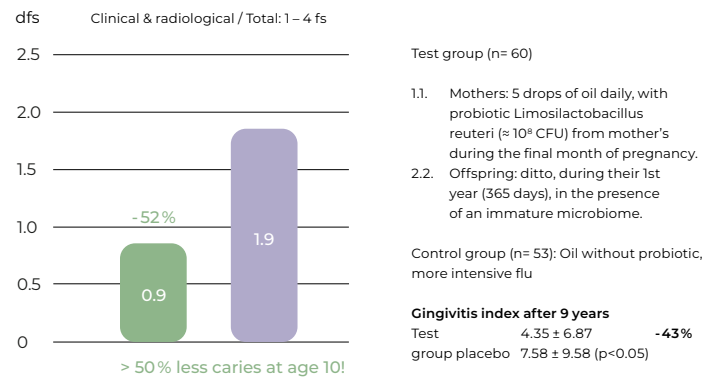
AE = activated endothelial cell; GIT = gastrointestinal tract; LPS = lipopolysaccharide; NCD = non-communicable diseases; SCI = systemic chronic inflammation

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FIGURE 4

Caries and gingivitis in 9-year-old children



All of the children over two years of age demonstrated through unsupervised developmental randomization in double blind trials, statistically highly significant results

d = decayed by grades 1-4, f = filled/s=surface

In this experiment, the mothers took 5 drops of oil with probiotic *Limosilactobacillus reuteri* every day four weeks before the birth (to get used to it). The infants/toddlers received 5 drops of oil containing probiotic *Limosilactobacillus reuteri* or a placebo oil daily from their mothers during the first year of life. The children’s caries and other parameters (gum inflammation) were examined in a blinded manner shortly after the age of nine (Stensson et al. 2014) [6].

Unacceptable global burden of oral disease



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The global challenge of oral disease affects billions worldwide, yet remains underestimated. With significant health and economic impacts, it demands a shift towards holistic prevention and integrated healthcare. The WHO's Global Strategy for Oral Health sets a vision for equitable oral care, emphasizing prevention, innovation, and collaboration across health sectors.

Oral health is a fundamental component of health and physical and mental wellbeing. It is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex¹.

The scale of the challenge

However, good oral health is enjoyed by all too few people worldwide and the global burden of oral diseases is a wide-

ly underestimated challenge for almost all countries worldwide². Oral diseases are the most widespread of all the noncommunicable diseases (NCDs) affecting almost half of the world's population³. They have serious health impacts, adversely affecting the quality of life of those affected⁴. Even though largely preventable, oral conditions are a substantial global population health challenge⁵ and it has been estimated that they affect 3.5 billion people worldwide. Of these 2.3 billion have untreated decay of their permanent teeth; around 800 million have severe periodontal (gum) disease; half a billion chil-



dren have untreated decay in their deciduous teeth, and 267 million people have complete tooth loss⁶. Oral cancer accounts for a significant number of the remaining cases, with an estimated incidence of 300,000 to 700,000 new cases occurring every year. With a high mortality rate, oral cancer is among the ten most common cancers, depending on country or world region².

A major driver of health expenditure

The burden of oral disease remains unacceptably high and oral healthcare is one of the costliest of all health services. Worldwide, oral diseases and conditions accounted for US\$ 357 billion in direct costs and US\$ 188 billion in indirect costs in 2015⁷ and the cost of treating oral diseases is a major

Worldwide, oral diseases and conditions accounted for US\$ 357 billion in direct costs and US\$ 188 billion in indirect costs (2015).

driver of health expenditure, especially in high-income countries. In 2015 they were the third most expensive of health service costs in the European Union, exceeded only by diabetes and cardiovascular disease⁵. In low- and middle-income countries access to oral healthcare services is often either poor or non-existent, which can expose households to the risk of catastrophic health expenditure or preclude them from oral healthcare entirely.

Persistent oral health inequalities exist within and between countries worldwide. Like most chronic diseases, the prevalence of oral diseases is socially patterned and follow the social gradient, with oral health declining in a step-wise fashion along the gradient⁸. The lower an individual's socioeconomic position the worse their oral health will be, with the consequence that oral diseases and conditions disproportionately affect the poor, vulnerable and marginalized members of societies.

Significant impact on quality of life

In addition to their economic impacts, oral diseases also have a significant adverse impact on the quality of life. In children they are the most common causes of pain that disturbs sleep and contributes to poor school performance. Between 2016–2017, dental extractions under general anaesthesia were the most common reason for hospital admission for children aged five to nine years in the United Kingdom. Similar patterns were also seen in Australia, The United States and New Zealand⁹. In adults and older people, dental pain, suffering and discomfort severely restrict dietary intakes, social functioning, and can lead to reduced economic productivity¹⁰. These high levels of oral disease and their wider impact on health and development constitute a major public health challenge, especially in disadvantaged groups in all countries¹¹ and even where overall improvements in oral health have occurred, inequalities persist¹².

Meeting the challenge: the need for a different approach

It is clear from the evidence that the current approaches to the delivery of

oral healthcare have not been effective in reducing the overall burden of disease. The traditional high-income country model of dental care is inappropriate for the management of disease at the global level. Not only is it unaffordable, but in low and middle-income countries the necessary human resources are simply unavailable or distributed unequally, so very different models of care will be required. If sustainable improvements in oral health and a reduction in oral health inequalities are to be achieved, strategies will be required to both manage the existing burden of disease and deliver effective population-level prevention.

It is now widely accepted that oral diseases share common risk factors with other NCDs, especially high sugar intake, all forms of tobacco use, and harmful alcohol consumption. They also share the same social determinants of health; the conditions in which people are born, grow, work, live, and age, the systems put in place to deal with illness, and the wider set of forces and systems shaping the conditions of daily life. Social determinants of health matter because addressing them not only helps prevent illness, but also promotes healthy lives and societal equity. In 2023 the World Health Organization (WHO) also recognised the commercial determinants of health as a key social determinant¹³. These include the conditions, actions and omissions by commercial actors that affect health. Prevailing interventions that focus on modifying health behaviours and lifestyle choices have only limited success, because the ignore the wider social influences that determine these choices. Only a broader integrative strategy that takes account of the common risk factors and determinants of health of health will result in fair and equitable approaches to promoting better oral and general health².

In addition to their shared determinants and risk factors, there has been considerable interest in the potential links between oral diseases and a range of chronic diseases, particularly diabetes and cardiovascular disease, and how these affect each other in a bidirectional fashion¹⁴. The strongest and

most consistent evidence so far has shown an association between severe periodontal disease and diabetes mellitus, where clinical interventions to treat severe periodontal disease have shown improvements in diabetes status, at least in the short term¹⁵.

Planning for the future: the WHO Global Strategy for Oral Health

For too long the global burden of oral disease has been ignored at the highest policy levels and oral healthcare has existed in its own silo, separate from the rest of healthcare. Oral health care systems have been inadequately funded, are commonly delivered by independent private providers, and isolated from the broader health care system. Consequently, in most countries universal healthcare (UHC) benefit packages and NCD interventions do not include essential oral health care. Given the strong evidence that oral diseases share determinants and risk factors with the other NCDs, this is no longer an acceptable situation.

In 2021 the World Health Assembly (WHA) acknowledged that the global burden of oral diseases and conditions was an urgent public health challenge, leading to a resolution at that oral health should be firmly embedded within the NCD agenda and that oral health care interventions should be in-

Globally, there is a strong recognition that human resources for health are fundamentally important to deliver effective care, accessible to all people.

cluded in UHC programmes¹⁶. WHO was subsequently charged with developing a Global Strategy for Oral Health and this was approved by the WHA in 2022. The vision for the Strategy¹⁷ is that oral health should be included in UHC packages for all individuals and communities by 2030, enabling them to enjoy the highest attainable state of oral health contributing to healthy and active lives. The six guiding principles of the Strategy are:

- a public health approach to oral health.
- integration of oral health into primary health care.
- innovative workforce models to respond to population needs for oral health.
- people-centred oral health care.
- tailored oral health interventions across the life course.
- optimizing digital technologies for oral health.

These principles are closely related to the FDI World Dental Federation's Vision 2030: Delivering Optimal Oral Health for All¹⁸. This report makes the case for essential oral health services to be integrated into healthcare in every country so that appropriate quality oral healthcare becomes available, accessible, and affordable for all; for oral and general person-centred healthcare to be integrated, leading to more effective prevention and management of oral diseases and improved health and well-being, and for oral health professionals to collaborate with a wide range of health workers to deliver sustainable, health-needs based and people centred healthcare.

In conclusion: expect excellent oral health

In common with the other NCDs, oral disease will not be eradicated through treatment alone. Instead, health systems should incorporate population-level prevention; oral health should be included in all universal healthcare packages, and there should be much closer integration of oral health and general health. There needs to be a significant shift in health behaviours in which we accept responsibility for maintaining our own oral

health, rather than being passive recipients of care. For this to be achieved there needs to be an improvement in oral health literacy, both among health professionals and the population at large. In addition to delivering the population-level objectives, significant changes in behaviour will be required, not just of individuals but of the oral health sector itself with a person-centred approach that focuses on disease prevention from the outset.

The current exclusion of oral health services from public healthcare packages leaves people at an unnecessarily high risk of catastrophic health expenditures. As important as it is to change behaviours, there must equally be a push for regulatory change to address the upstream determinants of oral disease including education, accessibility of healthy foods and good self-care routines.

Substantial progress towards putting oral health back on the global health agenda has been achieved through the landmark WHO resolution to establish a Global Strategy for Oral Health. Now that we have a vision and target set for 2030, the challenge is to build on evidence-based research to make the case for including oral health as part of UHC benefits packages and national NCD intervention strategies. First steps will be to define a set of safe, cost-effective interventions to prevent and treat the most common oral diseases at an early stage. It is also imperative to engage with the private sector and civil society to drive reform in regulations surrounding unhealthy commodity industries, notably tobacco, alcohol, and sugar, to arrest the continued promotion of harmful goods.

Globally, there is a strong recognition that human resources for health are fundamentally important to deliver effective care, accessible to all people. This includes a focus on prevention, screening for and monitoring of systemic health conditions, environmentally friendly practices, and an appropriate, responsible use of technology that benefits patients. Successful oral health resource and workforce planning is critical to the sustainability of

For too long the global burden of oral disease has been ignored at the highest policy levels.

a healthcare system and should be developed in close cooperation between governments, educators, and the oral health profession to ensure the delivery of the right care, in the right place, at the right time, by the right number of people, to those most in need.

Ultimately, we are generators of our own health and should not be resigning ourselves to the inevitability of disease but must instead come to expect excellent oral health across our life course. The challenge for us now is to implement the measures articulated in the WHO Global Strategy for Oral Health.

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When health-beneficial behavior becomes a habit



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Merging insights from behavioral economics and health economics offers a fascinating insight into the complex relationships between individual behavior, treatment outcomes and decision-making processes in healthcare. This interdisciplinary perspective allows us to understand the complex influences that shape the behavior of patients, providers and decision-makers in the healthcare system. By analyzing psychological and economic factors, well-grounded approaches can be developed to improve the effectiveness and efficiency of healthcare measures and improve quality of care.

In the last three decades, behavioral economics has gained in-depth insights into how people make irrational decisions in a predictable manner (Kahnemann, 2011). Psychological factors and cognitive biases are relevant in many areas of life, not only with regard to ‘classic’ economic issues, but also notably in healthcare. The relatively new interdisciplinary field of ‘behavioral health economics’ combines elements of both behavioral economics and health economics to better understand how individual behavior influences treatment outcomes and decisions in the healthcare system (Hanoch et al., 2017, Attema et al. 2022).

Immediate rewards versus future benefits

Assuming the human concept of the rational ‘homo economicus’, it would be sufficient to impart knowledge on appropriate health care and sensible behavior. However, behavioral economics has in various ways demonstrated that it would be naïve to assume that an informed individual would then make the appropriate decisions and consistently follow a plan once it has been made. So-called ‘present-biased preferences’ (Frederick, Loewenstein und O’Dono-

ghue 2002, O’Donoghue and Rabin 2015) are a major obstacle.

The ‘present-biased preferences’ model plays a pivotal role in classic behavioral economics and describes the human tendency to value immediate rewards or benefits over future benefits, even if the future benefits objectively outweigh them. The underlying pattern of behavior can be easily described using an example. If a child is asked if they want one toy in exactly one week or two toys in one week and one day, they will be willing to wait the extra day to get two toys. The decision makes sense, as the ‘return on investment’ is high: by deferring the reward for just one day, they can get two toys instead of just one. Moreover, from today’s perspective, it hardly makes a difference whether they have to wait seven or eight days – both dates are ‘far’ in the future. However, a week later, the decision is often reversed. It is still true that they would only have to wait one day to double the number of toys. But the earlier point in time is no longer a point in the ‘distant’ future, but the present moment. And: most people – not just the chil-

dren in our example – assign particular weight to the immediate now. They do not stick to their original plan to wait a day but succumb to the temptation of the present: A lack of willpower and self-discipline means that they do not follow through with the decision that is more beneficial in the long term.

Benefits are often in the future

What may seem like a trivial problem in our example describes a general decision-making error that can have serious consequences. After all, many important life areas are structured in such a way that costs or sacrifices are incurred immediately, while the benefits occur in the future:

- I have to curb my spending today in order to achieve better economic security in the future.
- I have to make the effort to learn today in order to achieve a higher future income thanks to a better education.
- I need to invest in my health today – exercise, eat healthily, spend time on proper dental care, etc. – in order to reap the benefits of better health in the future.

The problem is exacerbated by the fact that many people are overly optimistic

about their willpower and self-control. For instance, a classic study has shown that many members of gyms misjudged their future gym use and opted for monthly subscriptions instead of single admissions. Purchasing a monthly subscription meant that they paid more on average per visit than if they had opted for single admissions. The study is an example of how present-biased preferences and overestimation can lead to suboptimal decisions (DellaVigna und Malmendier, 2006).

Steering behavior in a beneficial direction

‘Nudges’ are a type of intervention that can help people overcome problems that arise from a lack of willpower and self-discipline in everyday life. Fundamental to this type of intervention is that it aims to steer people’s behavior in a certain, often socially or individually beneficial direction without restricting their options. A wide range of nudges have been tested in the field of preventive healthcare. These include displaying healthy foods prominently in school canteens, simple text message reminders for preventive checkups or communicating social norms. (Thaler and Sunstein, 2008).

A prompt to make concrete action plans, known as ‘implementation intentions’, is also a classic nudge (Gollwitzer, 1999). This nudge was examined, for example, in the context of a free, in-house flu jab. All employees were informed in writing about the opportunity to receive a flu jab on the company premises during working hours. Participants in an intervention group were

One key mechanism is building ‘good habits’

also encouraged to make a note on the information sheet of the date and time when they intended to get the jab. The core finding of the study: vaccination rates increased when the invitation to make specific implementation intentions was included on the information sheet. The vaccination rate among the employees in the intervention group was 4.2 percentage points higher than in the control group, which had a vaccination rate of 33.1 percent. Nudges help transform abstract goals into concrete action plans. Deviating from the specific intention would incur a mental cost, which contributes to people actually taking advantage of health-related measures, such as the flu vaccination in this case (Milkman et al., 2011).

Building ‘good habits’

If people are able to realistically assess their willpower and self-control, self-commitment mechanisms can provide support. One key mechanism is building ‘good habits’. Once a healthy behavior becomes a habit, people automatically engage in it without much thought. Habits also ensure behavioral consistency, reduce decision-making stress or reinforce a positive self-identity that is consistent with health-related behaviors (Wood 2019).

A pivotal question is how we can successfully build good habits. The literature identifies various techniques. ‘Temptation Bundling’ combines an enjoyable activity with one we tend to put off, such as only listening to gripping audio books while at the gym. The aim is to utilize the pleasure of one activity (listening to an audio book) to make the less enjoyable activity (exercising) more attractive and thereby more regular. A classic economic strategy is to create ‘commitment devices’, such as financial stakes which we lose if we fail to reach the set goal. One example of this is using apps or platforms that withhold money or even donate it to undesirable organizations if we fail to meet self-imposed targets. Ultimately, it is important to have social support when building habits, as involving friends or family in personal goals can provide additional motivation (Milkman 2021).

Knowledge alone is not enough

The key insight – that it is not sufficient to equip people with the knowledge of how important preventive health care is, and which behaviors would be beneficial to their health – is sometimes referred to as the ‘last mile problem’. The term generally refers to the difficulties in designing and implementing effective health-promoting measures and information in such a way that they reach and influence people’s actual everyday decisions. The behavioral economics model of present-biased preferences offers a convincing explanatory approach and a starting point for possible solutions that should be incorporated into a more comprehensive approach to promoting preventive healthcare.

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Rituals shape our lives – let’s draw strength from them

Author — Bruno Affentranger

Anyone who performs an action and repeats it every day is familiar with this phenomenon: the power of habit. Humans need rituals. They provide stability and reliability. They give us the assurance that we exist and will continue to exist. If we want to change or accomplish anything in a social context, we need to embrace rituals – and get the timing right.

Curaden is a global oral hygiene company that provides products and services and sells them in ninety countries worldwide. Why is this Swiss family-owned business taking the initiative and commissioning a study from the Gottlieb Duttweiler Institute in Switzerland to research rituals? The study is titled “Prevention in transition. Stable routines in unstable times”. Read the interview with David Bosshart starting on page 34. Let’s start by answering the question of ‘why’ with another question: When is the one tiny moment in which the average private household can take a big step towards protecting the climate? Correct! When our old oil-fired heating system reaches the end of its lifespan. When we finally switch to a heat pump, which extracts energy from the air, water or ground to conserve the planet’s fossil reserves. This moment of transition in our own home is the moment

prevention, certain in the knowledge that doing it right can ensure a healthy mouth for life.

Changing behaviour is crucial

Having recently invested extensively in studies with the Gottlieb Duttweiler Institute in Zurich, we have discovered that human behaviour is the key starting point. Scientists such as the American professor Wendy Wood and others are researching this on a global scale. It is thanks to them that we now know that we need to change our behaviour to boost the importance of prevention. The concept of self-care and personal responsibility needs to grow. It’s just a shame that engrained behaviours are not so easy to change.

But there are these moments when new situations arise. During these periods, people are particularly receptive to new behaviours. This doesn’t just happen out of the blue. These moments don’t usually happen of their own accord. They can and must be brought about. But how to do this? We have also conducted research into this and are continuing to do so. We are firmly convinced that state intervention, for instance, is important. This is not about more bans, but rather offering new incentives and through structural measures. Through a changed, new training programme for specialists at universities. By educating professors and students and winning them over to our cause. Through lobbying political decision-makers. By means of campaigns that are about more than just selling goods.

It can’t be done alone

Despite all our efforts, all our good intentions and the full commitment of the entire company, one thing is clear to us Swiss oral hygiene specialists: we are too small on our own. We can’t do it alone. On paper, we simply aren’t a game-changer. But thanks to scientific principles, new media and plenty of groundwork, Curaden can have more influence and impact than many people think. Many allies are forming and share the same intentions. Curaden is by no means alone with its prevention-led approach. As always, it is about taking the first step. Without this, behaviour will not change and new rituals of good prevention cannot develop.

“Rituals help us get a better handle on life.”

Interview — Bruno Affentranger

Trend analyst and former CEO of the Swiss Gottlieb Duttweiler Institute, David Bosshart, on unstable times, reckless behaviour in our part of the world and why all this can still be an opportunity for the prevention cause.

The study “Prevention in transition. Stable routines in unstable times”, explores health-promoting behaviours. Are we humans creatures of habit?

David Bosshart: Yes, we tend to repeat and imitate our behaviour. But since industrialization and the accelerated technologization of everyday life, all the behaviours we are familiar with have gradually been turned on their heads. Things that went without saying – how we went about our daily lives, breakfast, lunch, afternoon snack, dinner – were completely ritualized. In other words, we no longer had to think

about them and just did them automatically. Our eating habits were driven by the parameters set by religion. We ate fish on Friday. Too much meat was not only unhealthy, but also too expensive and a luxury commodity. Frugality was the order of the day, people didn't overeat and didn't throw away bread. Technology-driven prosperity, individualization and personalization have swept aside all these rituals.

So it wasn't even necessary for people to self-regulate back then?

In the 20th century, there was still a shortage of goods and products. We had no opportunity to be wasteful with resources such as food. It is the insanity of the 20th century that we in the rich world have managed to avoid famine while at the same time reckless behaviour has become rampant. Everyone tends to do what they want.

What does this mean when applied to the history of oral hygiene?

The 20th century saw a breakthrough. Today, everyone knows that they should brush their teeth at least twice a day. This has had an incredibly

powerful effect on public health. The automation of rituals makes people's day-to-day lives easier. They help us get a better handle on life. A lack of rituals means a lack of certainties. During the Covid pandemic, we were bombarded with new information on a daily basis – as de-ritualized people, this has made us even more insecure. The Covid pandemic stands as a lesson in itself.

In what way?

Compared to conformist societies such as Japan, our Swiss society is much less equipped to act quickly and efficiently. In Japan, people wear face masks out of politeness when they have a cold, which is also a ritual. They avoid being in spaces where there are a lot of people. We, on the other hand, live a life of individualization and personalization, in which everyone does as they please and no one does what they should. In the end, everyone knows what they cannot do.

Did religion ritually domesticate us with its commandments, and is that what is lacking today? Is there a substitute for this?

We humans have become more and more free. Freedom is often confused with independence. Freedom can only



Dr. David Bosshart

Futurist, Philosopher, Retail & Consumer Analyst, Global and Local Speaker, Executive Advisor and Founder of Bosshart & Partners, an international network of "pragmatic visionaries".

be understood in relation to the people I live with. The more liberalized the rules are and the freer I am as a result, the more I need discipline and willpower in my dealings with other people. This is obviously difficult and made more difficult by advancing mechanization.

Why is that?

Algorithms are very powerful. If my mobile phone knows that I always have a craving for something sweet at 4 pm, it will show me an offer for a snack at exactly the right time. At some point, in the middle of a deep glucose trough and with no willpower, I will get an offer to order a pizza – that’s what I call seducing and manipulating people with new behaviours. As a counterbalance, the individualized and personalized world needs even more discipline and willpower.

In the GDI study “Prevention in transition. Stable routines in unstable times”, the authors write that human self-empowerment will become increasingly important. This self-empowerment requires self-regulation. People must be able to manage their lives in a reasonably self-determined manner and in order to do so, they must recognize what is happening. Asking this of people is huge. Most people can’t achieve it. Many can’t afford it either. This is supported by the fact that we have more and more laws. They help us.

That’s true. And Migros founder Gottlieb Duttweiler, aptly said: “Voluntariness is the price of freedom.” Since we live in a society in which there are many loners, families without offspring or only children, the question arises as to what is happening in another area, specifically the transfer of knowledge and values. In China, we see a society with authoritarian values and a strong emphasis on experience and age. Let me come back to nutrition, which is simply the best way to illustrate developments. This is my primary focus.

Please do.

My grandmother bred chickens, slaughtered and plucked them herself.

She knew how to properly handle and prepare a chicken for her family. Her daughter, my mother, bought chicken thighs from the supermarket. My grandmother’s grandchildren bought ready-made chicken sandwiches from a convenience store. At best, the great-grandchildren know how many calories a sandwich contains and whether it is vegan. As you can see: knowledge has become honed and specialized. It has no longer developed in a ritualized overall context.

According to the study, factors such as mental health, social environment, education level, income, age and gender reinforce or facilitate health-promoting behaviour. Is that surprising?

Yes and no. The list is correct. But I’d like to come back to the question already posed by other people: “Programmed or be programmed” – which is true? Do I decide with my own free will or do I allow myself to be programmed, guided and directed by the machine because it’s convenient?

Do you think that machines will take over the ritualization of our lives one day?

Machines are already structuring our everyday lives. We already live most of our life based on software programmes without even realizing it. It’s an irony of history. During and after the 1968 movement, people tried to dismantle rituals. Now they have been replaced by more powerful and appealing, algorithmically generated rituals. This programming is unique. We have constantly implemented what is technically possible, step by step. Nevertheless, people seem to mistrust advancing mechanization.

Why do you think that is?

The Covid pandemic in particular has demonstrated how widespread a critical attitude towards tracking and exploiting technical traces is. In our part of the world, enthusiasm for data protection predominates. It outweighs the belief in the usefulness of data. We are physical human with a guarded attitude towards a disembodied, digital

world. This disembodied world functions in a calculated fashion, based on probability calculations, statistics and behavioural measurements. The aim of artificial intelligence is to be able to predict human behaviour more accurately.

How do health-promoting behaviours – rituals – relate to prevention?

Prevention is already very strongly predetermined. Humans have an incredibly strong, robust and resilient survival instinct. However, just as with farm animals, we humans have reached a high level of breeding. Today we realize that our robustness is less robust than we originally thought. We are looking for ways out and are turning to organic and locally produced food in the pursuit of greater transparency and safety. We want to live healthier and, above all, longer lives, and we know that we can better achieve this with certain preventive measures.

Nevertheless, the number of people who are taking less exercise and generally adopting unhealthier behaviour has risen, especially during the pandemic.

Willpower, free will, is lacking or being overridden by the convenience of working from home with less exercise. None of this is conducive to adaptability.

Are we entering an age of prevention – or is that too optimistic a view?

The most important starting point today is prevention and health promotion. From an economic point of view, however, this is not yet a reality. The revenues per square meter in medicine are no doubt at their highest where repairs are carried out and not where preventive care is provided.

Medical and repair services also yield higher margins.

We shouldn’t ignore this economic reality. Keynes already said that everything that is invested in the comparatively distant future is discounted at a high interest rate. Translated, this means that it is practically impossible to get a 20- or 25-year-old to start thinking about their pension fund.

Two years before retirement, people start looking at what they can expect. It is enormously challenging to reward long-term thinking in a society that knows no scarcity and only immediate availability in such a way that people will actually reflect on it.

We are physical and not digitalized beings – if we were just about the maths, we would already be acting in a more preventive manner.

That is true. But this physicality is also being eroded. We are in the midst of the transition from the chemical to the biological age – this is particularly evident in agriculture– and we will perform biological manipulations that we still balk at today.

Today, preventive measures account for a maximum of three percent of total health expenditure in this country. How are we supposed to achieve a target of thirty to fifty percent?

This is a question for civil society. What do we want? The East Asian countries are moving in this direction. Switzerland, on the other hand, looks at what its neighbour is doing – and is then bound to do it differently. The dogged individualism in Switzerland is in competition with the joint efforts that we need to address or promote pensions, healthcare, energy policy. We know that we should be facing this head on, but we are not doing so. The question will be: What do we tackle together and by choice and what will only happen through coercion?

Which brings us back to our initial topic of freedom.

We firmly believe that people should be empowered as far as possible. What happens voluntarily and of our own accord is always more stable than what is brought about through coercion.

Is this self-empowerment a delusion; something that does not exist?

We are driven by the belief that we will be able to coexist happily together in a free world in the future. With mutual respect and keeping public costs to a minimum.

The optimistically set-out self-regulation and empowerment of human beings in the study collides with a complete handover of private matters to the state, which in turn promises and endlessly funds services.

We live in a world of experts. This was already apparent in the industrial world of the 1950s to 1980s. But in the age of digitalisation, which is moving ever further towards extremes such as exponentiality, this has become many times more acute. The need for experts is greater than ever. They may not make the world safer, but they can advise us and keep us informed about the latest scientific developments. At the same time, the risk level is increasing because we are more interconnected and live in a globalized world with complex flows of goods, logistics and finance.

Humans have an incredibly strong, robust and resilient survival instinct.

In this world, the pressure to regulate more is increasing – we want to regain control of that which we cannot grasp. So far, we have seen this happening in the world of finance. Over the next few years, the food sector will see stronger regulation – for instance in the way we deal with sugar. We are leaving behind the old rituals and a shared world. We are reassembling them in an abstract sphere and driven by algorithms.

This is the perfect description of the death of the liberal world.

Even today’s liberals are writing that the liberal world is finished. Yuval Noah Harari put it succinctly: if we recognize that free will and thus the autonomous subject do not exist, then

the liberal world is dead. But we can think in Kantian terms: we have intelligence, we have incredible brain power, visions, ideas, prototypes, we can control the world in many ways. But in the end we lack the will. As Kant put it: “Humankind is endowed with reason, but is made of crooked timber.” The last question pertains to the image of humankind.

Are we heading back to the pre-Enlightenment world, back to self-imposed immaturity?

This is the path we are on. There has never been a linear development, but rather always the hope that things will get better at some point. People need hope and faith. Without them there is no survival. Today we live in a world in which the polarities of hope and fear reign. In Germany, for example, fear is more prevalent. That’s a bad thing.

This brings us to a quasi-religious discussion.

We no longer need to discuss religious denominations. What do we believe in? What do the markets believe in? In VW or in Tesla? People who believe in VW believe that a car is essentially a hardware product. Those who believe in Tesla believe in software products – and everything will turn out fine at some point. The markets provide the answer. People make them, they believe in Tesla. But that can change.

Who will determine what proper health is in the future?

A look at the megatrends points to growing health awareness. But just as with tangible or intangible affluence, we cannot identify a benchmark for an appropriate measurement. There is no consensus on whether living for as long as possible is the most important factor. Incidentally, this is what our current healthcare system is based on; that people should live as long as possible. But although we know that we can undertake anything from the age of 75, our quality of life will never be the same as before. (Emanuel Ezequiel: “Why I hope to die at 75”). Can we put a price on life? Can we even talk about a worth of 10 million dollars, as US scientists have calculated? These are philosophical questions that we cannot answer.

Microbiota Vault – the ‘Noah’s Ark’ for intestinal bacteria



Be it a modern or a somewhat archaic refuge: it's the content of our intestines that really counts.

Author — Angel Gonzalo

Biodiversity probably isn't the first thing we'd associate with our gut, even though it harbours an extremely diverse ecosystem. A single gram of intestinal content contains billions of microbes that are intricately interlinked and probably have a major influence on our health. This needs to be systematically documented. In Switzerland, researchers are storing human faeces for the future.

An exceptional biobank for future generations is taking shape at the University of Zurich: As microbes in the gut are under threat of extinction, researchers intend to store human faeces from a wide variety of countries and cultures. The underlying aim is to gain knowledge from this in order to cure diseases. Similar to the Human Genome Project or the Human Cell Atlas, the *Microbiota Vault database* will contain a blueprint of the microbiota of humans, plants, animals, soils and natural environments

on a global scale, which will serve as a catalyst for future research, innovation, conservation and restoration.

Extinction of species in the gut

The habitat in our bodies is changing. Many bacteria are becoming rarer – the intestines of the populations of industrialised Western countries in particular no longer seem to offer microbes a comfortable home. The South American scientist Maria Gloria Dominguez-Bello was among the first to study the microbiome. The professor at Rutgers University discovered that members of indigenous peoples in the Amazon region have a much more diverse gut flora than people in Europe and the USA. Our microbiome is becoming increasingly impoverished. Species that protect us from diseases or have other important functions might disappear. By 2050, two thirds of humanity will probably be living in cities, which will further fuel the extinction of species in the gut. The reasons for this lie in our diet and lifestyle, but also in our medication. Antibiotics specifically have a side effect of not only killing the bacteria that cause an infection, but also almost all others in the body. Yet most germs are very useful; they break down nutrients for us, aid digestion and allow our bodies to access vitamins from food. Researchers suspect that an impoverished or disrupted microbiome plays a role in the occurrence of a number of diseases. Preserving the diversity of species in our gut is the top priority of the Swiss-launched project, which is being driven forward by a number of universities in Switzerland and the USA.

Biobank for gut microbes

A type of 'Noah's Ark' has been set up at the University of Zurich for this purpose. A biobank for gut microbes is taking shape, similar to the seed vault on the Norwegian island of Svalbard, in which the seeds of all important food plants are frozen – as a kind of insurance for the future. In a sense, the research project to save the intestinal flora is a kind of faecal library on behalf of all countries in the world. For the time being, this library consists of several white freezers. The bacteria survive for many years at minus 80 degrees and can simply be defrosted again in the

Long-term project with potential

The Microbiota Vault project is of great significance for several reasons and has the potential to impact the future of mankind in many ways:

Health

The microbiota plays a crucial role in the health of humans, animals and plants. A better understanding of the microbiota can help us understand diseases, develop prevention strategies and improve treatments.

Environmental protection and sustainability

The microbiota also influences the health of ecosystems, including soils and water bodies. By collecting and analysing microbiota samples from different environments, we can better understand how human activities affect the microbiota and how we can protect and restore ecosystems.

Agriculture and food security

The microbiota plays an important role in soil fertility, plant health and yield.

A better understanding of the microbiota can help to develop more sustainable agricultural practices, improve food security and reduce the use of pesticides and fertilisers.

Innovation and technology

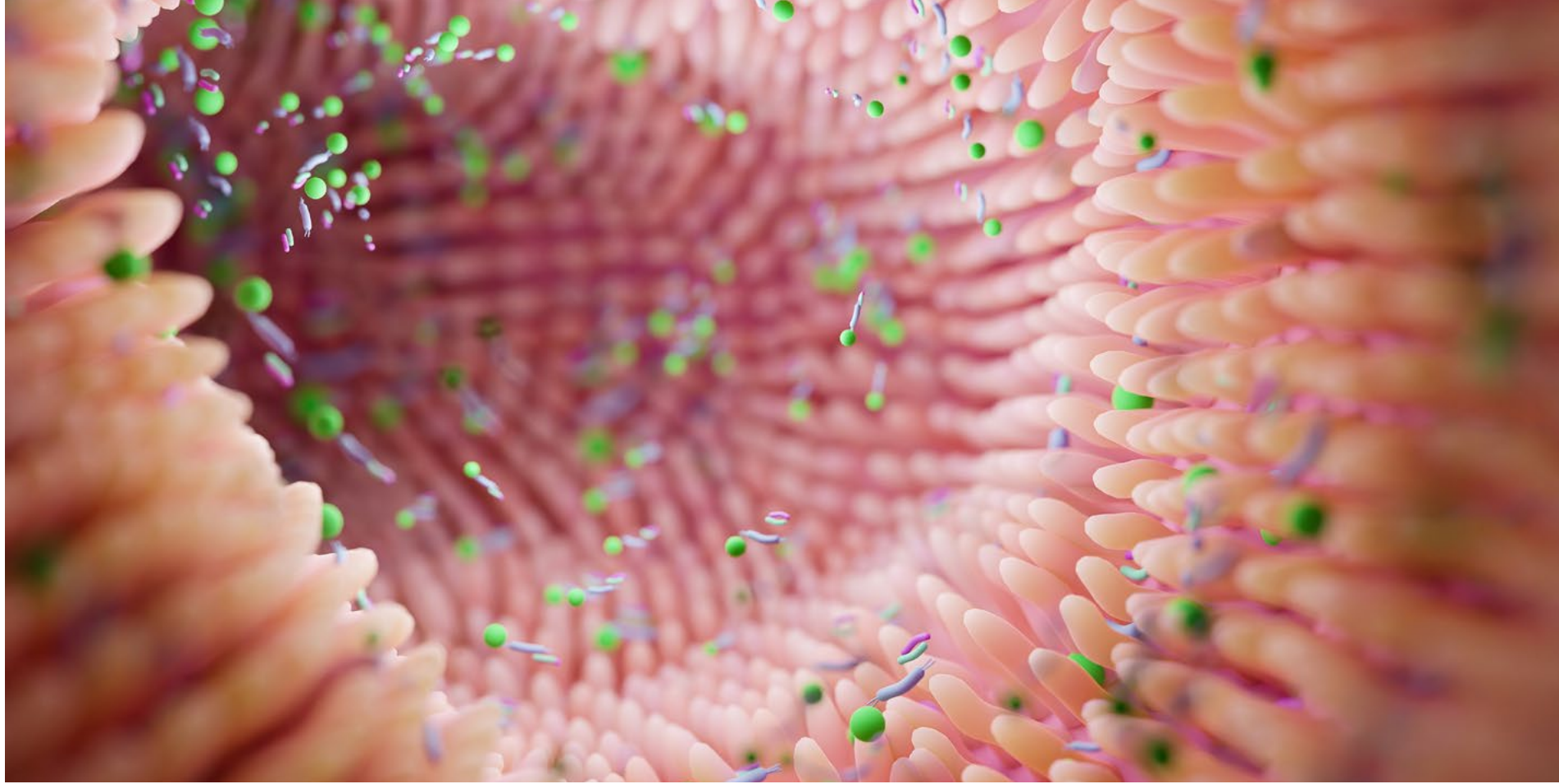
The Microbiota Vault project database will be a valuable resource for scientists and innovators around the world. It will enable researchers to gain new insights, develop innovative technologies and find solutions to pressing global challenges.

Cultural heritage and diversity

The microbiota is an important component of biodiversity and cultural heritage. The Microbiota Vault project will help to preserve the diversity of the microbiota and ensure that future generations can benefit from this rich heritage. As a whole, the project can act as a catalyst for research, innovation, conservation and restoration and have a positive impact on the future of humans and the planet.

future. The researchers have experimented with a wide range of preservation methods – from freeze-drying to adding nutrients and various freezing methods. But it's not just preservation that is complex and difficult – there are also legal i's to dot and t's to cross. It is not possible to simply collect and take stools from a foreign country, because stools are a cultural asset. Many legal

regulations must be met before faeces can be exported. The 'Noah's Ark' for intestinal bacteria is a very expensive and highly complex international project that is still in its infancy. A secure storage facility for the valuable faecal samples is being sought. The Microbiota Vault researchers have been looking around for Swiss army bunkers for future storage. One day, the faecal library will be safely stored deep within the solid rock of a mountain.



“The complex biochemical processes in the gut flora still hold many mysteries.”

Small creatures, big impact

Author — Angel Gonzalo

Our mouth is moist, warm and full of nooks and crannies – a perfect ecosystem for fungi, viruses, protozoa and at least 700 species of bacteria that inhabit it. It is the second most colonized microbiome in the body, after the one that inhabits our digestive system. ETH professor Dr Emma Slack gave an eye-opening glimpse into the fascinating world of microorganisms at a GDI conference.

The International Food Innovation Conference is an annual event dedicated to the future of food. Held at the Gottlieb Duttweiler Institute (GDI), the conference showcases current trends. In the last years, the spotlight was on bacterial strains in our bodies and the latest scientific and clinical breakthroughs that have established links between microbiome dysbiosis (an imbalance in the human gut flora) and various health conditions. There is, for instance, a growing body of research focusing on the modulation of the microbiome through nutritional approaches. This research is relevant,

especially as these microorganisms already initiate the digestive process in our mouths and ensure a healthy mouth. However, they can also trigger problems, of which bad breath and plaque build-up are just the beginning. Poor oral hygiene can lead to issues such as tooth decay or periodontitis (an infection of the gums), but also to much more serious conditions such as heart attacks or dementia.

Diversity is key

Microbiome research is a very active and important field. Committed scientists want to find out, for example, whether THE healthy microbiome exists and how its bacterial composition can be stimulated in people who are not lucky enough to have it in their gut from birth. For example, we now know that cancer, autism and autoimmune diseases ranging from multiple sclerosis to rheumatoid arthritis are linked to the microbiome. One scientist at the forefront of this research is ETH Professor of Food Immunology Dr Emma Slack. At the ETH in Zurich, she is studying the underlying mechanisms

that control the interactions between the immune system, the microbiota, host metabolism and microbes and nutrition. At the International Food Innovation Conference, she graphically illustrated how the microbiome of our gut influences our health and how we can influence our gut flora. According to Slack, our gut is colonized by vital ‘farm animals’ and it is important to understand how this ecosystem works. The key question is: how do bacteria influence our health and, conversely, how can we influence the microbes? We already know a lot about what constitutes unhealthy intestinal flora. A low diversity of different microbes, for example, is unfavourable. However: “We simply don’t yet know what a healthy microbiome looks like in all its diversity,” says Slack and adds: “This is currently the biggest challenge in global research.”

Everyone’s gut flora is individual

Today, we can easily compile a catalogue of the various microorganisms and catalogue the genes of the different bacteria, Slack explains, but we don’t know much about what the microbes actually do. This is because the catalogues say nothing about whether a bacterium is beneficial to health, neutral or pathogenic. According to Slack, there are E. coli strains that live in our intestines without any problems and are even beneficial to our health, while other strains are dangerous pathogens and can even be fatal. To complicate matters further, every person has a different composition of intestinal flora,

and this also varies along the intestine and depending on what we have eaten. In a nutshell: “The complex biochemical processes in the gut flora still hold many mysteries.” The E. coli bacterium illustrates this. In this microbe, which is probably the best-studied in the world, we only know what 70 percent of the genes do and what impact they have. Slack and her team at the ETH want to find out which genetic metabolic pathways are associated with a ‘healthy’ life. Another topic she is very interested in is the interplay between the microbiome and the immune system. This involves potentially dangerous E. coli and salmonella in pigs. Today, many pig farms use antibiotics to combat these germs, but the bacteria often develop resistance to them sooner or later. Together with her research team, Slack is developing a vaccine against E. coli and salmonella. She explains the simple idea behind it: “We feed dead bacteria, the animals love it!” Four pigs are taking part in this trial at the Strickhof Competence Center for Agriculture and Nutrition in Lindau ZH. All the animals are healthy and responding well to the oral vaccination. No results are yet available. For a second vaccination method, the research team is using individual Salmonella components to trigger a direct immune reaction in the mucous membranes. For now, this method is being tested on mice. The Zurich scientist is pursuing two goals with the oral vaccinations: to significantly reduce the amount of antibiotics used in pig breeding and to eliminate resistant bacteria from the microbiome. “If this works,” she says, “that would be fantastic, a huge step forward!”

We are what we eat



Dr Daniela Weiler

Works in medical oncology at the Tumour Center of the Lucerne Cantonal Hospital in Switzerland and is also a specialist in nutritional medicine.

Interview — Bruno Affentranger

Why do the bacteria populating our mouth matter to the rest of our body? And why does proper nutrition lead to overall health through good oral health? What can we ourselves do to prevent cancer? In conversation with Dr Daniela Weiler. She works in medical oncology at the Tumour Center of the Lucerne Cantonal Hospital in Switzerland and is also a specialist in nutritional medicine.

Dr Weiler, is the mouth the gateway to overall health?

That is certainly true. But it's not just bacteria that find their way into the body through the mouth. I see this in an even broader context. The mouth is the gateway for the food we eat, which then influences the diversity of bacteria. Eating and drinking are very important for our health. The gateway-to-health analogy is correct because the mouth cannot be viewed in isolation from the rest of the body. The correlation is particularly obvious when we are talking about inflammation. Inflammation in the mouth can have an impact on the entire body. Chronic inflammation in the mouth has a significant consequences for the whole body.

What are the effects of inflammation in the mouth?

Let's take periodontitis (gum disease), for instance. The bacteria in question are located in the mouth, but we can also detect them in tumours. We suspect that these bacteria – here we are talking about *Fusobacterium nucleatum*, *Porphyromonas gingivalis* and *Treponema denticola* – migrate

from the mouth into the intestines. They can be detected in colon cancer in particular. We have also seen evidence of them in oral tumours in the ear, nose and throat area. Likewise in pancreatic cancer. Conversely, it is evident that tumour patients with the aforementioned diseases also suffer more from periodontitis.

Has this been scientifically proven?

Studies confirm this. But the question is always: 'which comes first?'

So it might also be the other way around? Bacteria found in colon tumours can also find their way into the mouth?

A causation has yet to be proven, and I can imagine that is very difficult. But it is clear that there is a link.

Is anyone in research at all interested in these links?

Research into the microbiome has increased exponentially in recent years. A convention in Rome also reported on

bacteria that sit on the biofilms of tumours in the intestines, but which can also be found in the mouth. Research is still in its infancy. However, microbiome research is gradually finding its way into a clinical setting. We are discovering more and more connections and are aware of the importance of the microbiome in the treatment of cancer.

What is a microbiome?

The microbiome is the entire diversity of microorganisms that we carry on and in our bodies. Our guts are host to around one hundred trillion bacteria. Our body consists of 10 percent human cells and 90 percent non-human cells; this includes viruses, fungi and bacteria. That's an impressive ratio. Most of the bacterial flora can be found in the gastrointestinal tract, some is found on the skin.

The Swiss oral hygiene company CURADEN, which conducts intensive research in this area, has found that there are around 15 billion bacteria between two teeth, for example.

The figures are incredible. It is important to realize, however, that not all of these bacteria are harmful. Some are essential.

Research assumes that 80 percent are 'good' bacteria.

The pivotal question, of course, is how to remove the harmful bacteria without destroying the good bacteria.

Is that possible?

I believe it is possible with the right nutrition, which is where I come in with my speciality. People can strongly influence their intestinal bacteria and their diversity with their choice of food. It has been proven that, over the centu-

ries, humans have unfortunately lost a lot of this bacterial diversity.

Why do you put such emphasis on bacterial diversity?

Two major studies have proven a direct link between bacterial diversity and our health.

So the more varied our bacteria, the healthier we are?

Exactly.

What kind of diet is conducive to promoting bacterial diversity?

Eat more fibre. Consume less sugar and fewer trans fats, less white flour or meat. Eat more plants with their fibres.

Less meat?

Absolutely. Saturated fats are unhealthy. We consume far too much protein, saturated fats, salt and sugar today.

Plant-based and wholegrain foods are beneficial. Do you stick to this type of diet yourself?

Yes, most of the time. And more and more consistently in the last five years.

Did you want to lose weight?

No, but it's funny that you should ask. This excessive form of daily protein intake seems to have been ingrained in us since the time of the world wars. We are afraid that we, and especially our children, are not getting enough sustenance. People think they need to build up reserves. The outcome is that on average, we eat more than twice the amount of protein than we should. Every day.

How long does one have to change one's diet before the microbiome reacts?

This happens after a short time. Studies report changes within just one week. It is important to change our diet permanently, not for a limited period of time. Permanence is key.

Did you change your diet from one day to the next?

No, it was a step-by-step process. At first, we ate meat from grass-fed cows, i.e. from cows that are not artificially fattened but only eat grass. We know

Our body consists of 10 percent human cells and 90 percent non-human cells; this includes viruses, fungi and bacteria. That's an impressive ratio.

that this meat contains more omega-3 fatty acids and is therefore more similar to fish. We also cut down on saturated fats and only bought skimmed milk. After further study, we then gave up all meat, including chicken, as this has a much higher fat content in our part of the world than it used to.

Do you still eat fish?

Yes, but plant-based foods became my main focus. We don't consume any lacto-proteins at all, because they can trigger flare-ups in autoimmune diseases.

The media are engaging more with nutritional issues than ever before. Does that mean the time is ripe for this?

It's more a question of whether people are interested. Those who are interested are more likely to come across relevant reports in the media. There is also a lot of uncertainty in today's society. It's quite difficult to sort out the good and sensible information from the short-lived trends and fads. When it comes to nutrition, everyone is a specialist and has their own opinion.

Do different types of people require different nutrition?

I don't think so, but that's just my opinion. I've never come across any scientific support for this. It's practically impossible to provide the kind of clinical trial evidence we require for medicines. But it is possible to describe very clearly what is healthy, even if the food industry, among others, holds other interests and opinions.

In one of your nutrition brochures you describe a 3-pillar concept. What does that mean?

This is my very own definition of the important aspects in cancer prevention: diet, exercise and stress management. Alongside treatment, these three pillars can contribute to a better prognosis when coping with cancer. This is scientifically supported and proven. The three-pillar approach can also be applied in primary prevention, i.e. preventing people from developing cancer in the first place. Many observational and interventional studies deal with primary prevention. All too often, however, they only examine small dietary aspects, such as nut or olive oil consumption.

What is the number one cancer risk factor in our part of the world?

Obesity has overtaken smoking as a risk factor.

To sum up: proper nutrition goes through the mouth and leads to better prevention, but also to a greater likelihood of surviving cancer. Is that correct?

There is scientific support for this. The area where we have the least data is in palliative medicine, i.e. where we are already dealing with metastatic cancers. We can even go one step further: a plant-based, wholesome diet also has a positive effect against dementia, cardiovascular disease, diabetes and rheumatic diseases. And although the benefits may not be 100 percent proven in all of these cases: this form of nutrition does no harm – it certainly has fewer side effects than any of the medications used to combat the diseases.



Why do you never talk about smoking?

Everyone should know by now that smoking and alcohol are harmful. It's no longer necessary to point that out.

There's another point you don't mention – self-healing power. Why not?

Self-initiative is important and indeed crucial to the success of any therapy. People who take action themselves have a better prognosis. What strikes me is that patients and nursing professionals are very interested in these topics, more so than doctors, who perhaps simply don't have the time and are

Obesity has overtaken smoking as a risk factor.

too tied up in their specialist areas and everyday tasks.

You don't shy away from giving recipes to your patients. Why is that?

I want to show them that a healthy diet doesn't have to mean eating boring and bland food. My recipes aim for colour and variety.

Let's look to the future: could a regime that combines oral hygiene with nutrition improve cancer prevention?

It could certainly improve primary prevention. What we put in our mouth is extremely important. Another exciting aspect is the feedback between the microbiome and especially between gut bacteria and the brain. The brain and gut communicate with each other.

How can you tell?

I used to eat meat twice a day. I couldn't imagine a day without eating meat. Around six months after I changed my diet, my craving for meat disappeared completely. I don't miss it at all. I now even find particularly unhealthy forms of meat, such as sausages, repulsive. I am convinced that my intestinal flora has changed and is now signalling different desires to my brain. This makes sense and is verifiable, because my current gut bacteria want to survive and therefore demand that my mouth feeds it the right foods and avoids unsuitable ones.

What is your favourite food?

Salads, all vegetables, nuts, avocado, tofu, seitan, wholegrain rice, quinoa, sweet potatoes, bulgur, wholegrain pasta. I no longer have a favourite food. I used to love beef stroganoff.

The infinite expanse of space

Author — Angel Gonzalo

Astrophysicist Ben Moore can look back on around 13.8 billion years of cosmic history and knows with mathematical certainty when the world will end. And yet he comes across as reassuringly relaxed and unruffled. The holder of the Chair of Astrophysics at the University of Zurich is someone who wants to understand the history of our universe, how it came into being and how it will continue to evolve.

One thing we know for certain today is that our universe is expanding. This realisation allows us to draw fundamental conclusions about the past of the cosmos: if we could go back in time, the visible universe would become smaller and smaller. From a purely mathematical point of view, everything would eventually shrink to a single dot. The fact that we can assume that the universe is expanding at all is not thanks to Albert Einstein or the US astronomer Edwin Hubble, but to the Belgian priest and scientist Georges Lemaître (1894–1966). In his book ‘Sternenstaub’ (Stardust), which was published in 2022,

Ben Moore, Professor at the Center for Theoretical Astrophysics and Cosmology at the University of Zurich, tells this and other fascinating stories about well- and lesser-known scientists who, in his opinion, retroactively deserve a Nobel Prize.

Travelling for around 13.8 billion years

The age of the universe of around 13.8 billion years was determined by combining several scientific methods, in particular by measuring cosmic background radiation and observing distant galaxies. The basis for this calculation,

Ben Moore

Professor, Director of the Institute for Theoretical Physics at the University of Zurich.



Like our sun and the other planets in our solar system, the Earth was formed 4.5 billion years ago – a lengthy process, but not on a cosmic scale.

Moore explains, was introduced by Lemaître in 1927 at the Catholic University of Leuven with his groundbreaking discovery of an expanding universe. However, it was the American Allan Sandage who significantly contributed to determining the age of the universe. Sandage was an influential astronomer who was responsible for major advances in cosmology. He carried out detailed observations to more accurately determine the Hubble constant (the rate of expansion of the universe). He improved the measuring methods and reduced the uncertainties that existed in earlier determinations, thus refining the cosmic distance scale – this work was crucial to accurately measuring distances to remote galaxies. Together with other research, Sandage’s work helped fine-tune the methods that ultimately led to determining the age of the universe. He was one of the pioneers who were instrumental in improving the accuracy and reliability of cosmological parameters and thus deepening our understanding of the universe. And he is also one of the ‘unacknowledged heroes’ in Moore’s book ‘Sternenstaub’. According to today’s precise measurement methods, specifically the data from the Planck satellite, the age of the universe is estimated to be around 13.8 billion years. To be precise: The latest

and most accurate measurements from 2018 by the Planck mission put the age of the universe at around 13.787 ± 0.020 billion years. By comparison: When Ben Moore wrote his doctoral thesis in 1986 as a twenty-year-old, the calculated age of the universe at the time was 9 billion years with an uncertainty of ± 4 billion years. Today’s precision was achieved by analysing the cosmic microwave background radiation, which represents a snapshot of the universe around 380,000 years after the Big Bang. This data, combined with other cosmological observations and models, allows us to determine the age of the universe with great precision.

We are the product of a mature universe

Humanity can be described as the product of a mature universe. The first stars that formed after the Big Bang were spheres of hydrogen and helium – the first two elements of the periodic table – and cannot produce any form of life that we know or can conceive. Living organisms are made up of long chains and rings of carbon enriched with nitrogen, oxygen, fluorine, zinc and molybdenum, to name but a few. All of these atoms, which are heavier than

hydrogen, were formed in successive generations of stars that brought forth the elements of our bodies.

Like our sun and the other planets in our solar system, the Earth was formed 4.5 billion years ago – a lengthy process, but not on a cosmic scale.

When did life originate?

Genetics have discovered an elegant way to conceptually travel back in time: comparing the genomes of today’s living organisms. The more similar the genomes of two species, the younger their last common ancestor (LCA). Conversely, the more different they are, the older their LCA. Palaeontology can be used to infer when the last common ancestor of humans and apes lived or when we diverged from apes in evolutionary terms. There are no theoretical limits to this ‘genetic time machine’. It can be applied to modern life as a whole, thus allowing conclusions to be drawn about its origin, i.e. the last common ancestor or LUCA (Last Universal Common/Cellular Ancestor), as it is called. Nobody has seen LUCA: it is pure genetic deduction.

These studies are becoming more and more precise as more and more genomes are sequenced. The latest data allows us to calculate that LUCA lived no less than 4.2 billion years ago. Since

the Earth is around 4.5 billion years old, this leaves only 300 million years for the first organisms, such as bacteria, to have evolved from their mere chemical components. Animals took twice as long to evolve from single-celled organisms that were already almost as complex as we are.

The result seems to indicate that life can evolve with ease under the right physical and geological conditions. We are not the result of an unimaginable cosmic miracle, but of a process of prebiotic evolution that appears to be remarkably efficient. If it happened here, it must have happened on millions of planets in the galaxy, even if E.T. only appeared on Earth as a movie character.

What is the meaning behind it?

Do aliens exist, have they already been here or are they on their way? Ben Moore's razor-sharp mind analyses this matter-of-factly. Personally, he would be astonished if there was no life out there. Based on extrapolations, he reckons that "there are probably 40 billion planets in our galaxy alone, orbiting their respective stars in a zone where the temperature allows life to exist." Moore gives lectures on extraterrestrial life and its feasibility. No extraterrestrial, intelligent life has yet been found, but there are plenty of reasons why. Moore names two: "If it were an intelligent alien civilisation, the question is whether they would want to visit us at all. There are probably much more interesting things than us in space. Another argument is that highly developed civilisations destroy themselves before they reach the development stage of interstellar space travel." But Ben Moore's work is more concerned with robust science than speculating about where aliens might come from and what they look like. Besides teaching, he is the Swiss coordinator of ARRAKIHS, an ambitious mission selected by the European Space Agency (ESA) for its science programme. The somewhat unwieldy acronym ARRAKIHS stands for 'Analysis of Resolved Remnants of Accreted galaxies as a Key Instrument for Halo Surveys'. The project is being led by the Spanish astrophysicist Rafael Guzmán from the 'Instituto de Física de Cantabria', who studied at

Durham University at the same time as Moore. Research is focusing on around one hundred nearby galaxies and their surroundings. To this end, two wide-field telescopes will be launched into space by 2030, equipped with multiple filters to take the most in-depth images ever taken of a sample of 100 nearby galaxies. While most space telescopes like Hubble or James Webb only image a tiny part of the sky (it would take over

100 images to photograph the entire full moon), the wide-angle telescopes used could pack entire nearby galaxies into one image (the equivalent of four full moons). Moore, who loves teaching and living in Switzerland, is visibly proud that Swiss industry will provide an important part of the mission's payload. The passionate mountaineer and guitar player with his own band also finds time for another hobby, cosmic photography. A few of his spectacular pictures adorn this article. They give

The infinite expanse of space...



Ben Moore prepares his equipment for cosmic photography in the Namib Desert in Namibia.



The moon, in cosmic dimensions barely a stone's throw from the Earth.

the viewer a sense of the infinity of the universe.

And how does the story of our universe end? Are we all predestined to burn up until the last speck of stardust has disappeared? "This is hard to avoid," Moore smiles, but then reassuringly adds: "In around two billion years, the two galaxies Andromeda and our Milky Way will collide. Then it will get really uncomfortable on Earth." Until then, we have nothing to fear except that the sky will fall on our heads, as the Chief of the Gauls Vitalstatistix in 'Asterix and Obelix' constantly fears, or – even worse – that Donald Trump will be re-elected President of the USA in November.

Condensed into a single day

The universe is around 14 billion years old. Ben Moore puts this into context by mentally transferring this period to a one-day timeline in order to better grasp the dimensions: At midnight, i.e. 00:00, a tiny piece of space the size of an electron began to expand rapidly, perhaps triggered by a quantum fluctuation. Space and time were formed. One hour after midnight, the first stars were born. Shortly afterwards, they too exploded and all the heavier atoms in the periodic table were created. At around 10 am, our galaxy, the Milky Way, was formed. The first single-celled organisms appeared at 10 pm. At 11.35 pm, the dinosaurs populated the Earth, although they died out again at 11.52 pm – presumably due to an asteroid impact. The entire history of humankind took place in the last second before midnight. The pyramids were built 0.03 seconds ago.

Technically speaking: Are we stardust or not?

"How old are you?" It's a simple question that we've all been asked at some point. But the answer is not so simple. In fact, it's surprising when we think about where we come from. The key is to realise that the elements that make up our bodies are older than we think, even older than our planet.

It is often said that we are stardust. This may sound poetic, but it is not really true. When we ask ourselves how old our body is, we have to first look at what a human body actually is. It consists largely of water (around 60% of its mass). That's H₂O, two hydrogen atoms to one oxygen atom, which means that most of the approximately 7,000 quadrillion atoms (a number with 15 zeros) that make up our body are hydrogen.

So how old are these hydrogen atoms? Again, there's no simple answer. Hydrogen atoms are made up of a proton and an electron. According to the latest calculations, protons appeared in the universe around 13.8 billion years ago. To be more precise, the protons of practically all hydrogen atoms that exist today were created in the first second after the Big Bang. From the first second of our universe, the quarks (the smallest elementary particles), which previously dominated the entire cosmos to form protons and neutrons, 'disappeared'. Electrons were already quite old at this distant point in time, created between a millionth and a billionth of a second after the Big Bang. But electrons and protons did not combine to form hydrogen until around 380,000



years after the Big Bang. 62% of the atoms in our body make up 8% of its mass, so they are three times as old as our planet. This indicates that we are not so much stardust as is often claimed, but rather that most of our atoms were formed shortly after the Big Bang.

Around 63% of our body mass consists of oxygen

Oxygen is also part of the composition of our molecules and their atoms. This element is very important, because although hydrogen is the most common atom in our bodies, oxygen dominates in terms of mass. And how old is this oxygen? Astrophysicists have been asking themselves this question for decades and are looking for oxygen in ever more distant galaxies. It had already been discovered when the universe was less than 3% of its current age. Looking at distant galaxies means looking into the past, because they are so far away that the light takes almost an eternity to reach

us. And this delay allows us to travel in space-time. Studies show that three quarters of the oxygen in the universe today was created in the first half of the history of the cosmos and another quarter later. It can be assumed that oxygen has an average age of around 10.5 billion years. Viewed in cosmic dimensions, we too are that old.

This is roughly how far we have mapped out the age of our bodies. Let's move on from this brief journey of thought through the history of our body. Let's go into when the matter that has been dancing around in the universe for eons came together in this way and acquired a 'divine' quality that philosophy and religion have already spent several millennia trying to explain. Parts of our bodies filled part of the cosmic void long before, and they will return there sooner or later.

Tidbits of Science

Climatic truth is in the wine

Of all the different ways to learn about the climate of the past, winemakers' tasting notes are probably the least likely to come to mind. However, research into historical archives has yielded valuable insights into a hitherto barely documented era in Europe. Historian Christian Pfister from the University of Bern, a pioneer in the field of research into the climate of the past and its relationship to social and economic changes, has gone to the trouble of trawling through the must tasting notes kept in cellars and monasteries in Germany, Luxembourg, France and Switzerland since 1420. Pfister spent many years poring over historical records and weighty tomes such as the *Württembergische Wein-Chronik* (wine records for the Württemberg region surrounding Stuttgart). In doing so, he was able to shed light on what neither geology

nor tree rings could determine with certainty: the European climate between the 15th and 19th centuries. The best harvests were those that were harvested early, and if they were harvested early, it was because the heat and sunlight had a strong influence on the ripening of the grapes that year. This means that the grapes contain more sugar and therefore produce more alcohol when the wine ferments. By contrast, the worst grape musts were those that were harvested very late due to a cold and rainy summer: half-ripened grapes, low sugar and alcohol content. This is why the tasting notes of the winegrowers and monks act as a thermometer for centuries past. The accuracy of this method is remarkable. The best wines were produced from 1470 to 1479, from 1536 to 1545 and from 1945 to 1954, i.e. during the warmest and sunniest periods. It is also possible to precisely trace the cooler periods back to the worst tasting notes. Interestingly, the 1470s, which we have previously regarded as one of the periods with the best must ratings, more or less coincided with the beginning of the 'Little Ice Age' that cooled Europe between the 14th and 19th centuries. However, the first lowest temperature of this regional mini-ice age did not occur until 1650 (the last was in 1850), and it is possible that the plentiful harvest of the 1470s reflected a period of relative warmth in that context. The researchers in Bern are exploring ways to continue refining the climate calendar of this period. Who says historians don't have great ideas?



How bacteria metabolize plastic

Plastic is practical but problematic: although some plastic products can be recycled, they often accumulate in the environment instead, where they can last for centuries. Up until now, recycling materials made from different types of plastic has proved very difficult or barely feasible. These include products coated with the plastic polyester urethane (PEU), such as fishing nets, ropes and certain textiles. While PEU increases product longevity, it also makes them more difficult to break down.

A research team led by Jan de Witt from the Jülich Research Centre has

now taken a closer look at a type of bacteria that could offer a solution. The so-called *Halopseudomonas* bacteria are found in extreme environments, including deep ocean areas that are polluted with crude oil or heavy metals. The species that de Witt and his team were studying, however, *Halopseudomonas formosensis* FZJ, was isolated by researchers in a German compost heap. Their experiments showed that these bacteria can also break down the hydrocarbon structure of some plastics. The bacterium is able to grow on different types of PEU and utilizes this plastic as its sole carbon source. After 72 hours of cultivation, some PEU coatings were completely depolymerised. In addition to the high degradation rate, the research team discovered an important advantage of the isolated strain over other *Halopseudomonas* species: it was particularly tolerant of high temperatures and capable of degrading plastic at up to 50 degrees Celsius. Most other species only grow at temperatures of up to 37 degrees Celsius. This characteristic is important for potential industrial applications where high temperatures are often generated – similar to inside a compost heap, the natural habitat of *H. formosensis*.

The research team discovered that the bacterium produces an enzyme that is important for degrading plastic. When they switched off the gene for this enzyme, the genetically modified bacteria were barely able to break down the PEU. This finding demonstrates the crucial role of the identified enzyme and also shows that it is possible to genetically modify *H. formosensis*. In future applications, it would therefore also be conceivable to genetically increase enzyme production and thus the activity in plastic degradation.

Nuclear fusion: Big energy from small quantities

Nuclear fusion, the holy grail of energy, is moving ever closer to reality thanks to the efforts of around twenty start-ups in Europe, the United States and Canada. The most optimistic forecasts suggest that we could replace hydrocarbons with hydrogen atoms to power our factories and cities in just a decade's time. In contrast to nuclear fission, in which atomic nuclei are split to release energy, nuclear fusion involves the fusion of atomic nuclei at extremely high temperatures to produce enormous amounts of energy.

Fusing atoms to generate energy is not a new concept. As early as 1950, the Soviet physicist Andrei Sakharov designed the 'tokamak', a donut-shaped machine in which deuterium and tritium (two hydrogen isotopes) can reach the required temperature to fuse together and produce helium atoms, releasing an enormous amount of energy during the reaction.

Will the widespread use of nuclear fusion change the composition of the atmosphere one day? In nuclear fusion, nuclear reactions take place that are very different from the chemical processes we are familiar with from fuel combustion. And the advantage of nuclear fusion is that it can generate large amounts of energy with just a few grams of fuel. One gram of fuel can provide the energy equivalent of eight tonnes of oil. Just as the sun supplies the Earth with energy through fusion reactions, nuclear fusion could also provide large amounts of energy in the future.

Fusion reactors require very little fuel compared to conventional power plants. Exploiting nuclear fusion neither changes the composition of the atmosphere nor does it release greenhouse gases. Hydrogen isotopes such as deuterium and tritium are used for nuclear fusion. Deuterium is abundant in seawater, while tritium is produced in the reactor itself. At temperatures of over 100 million degrees, the atomic nuclei fuse in the plasma, releasing enormous amounts of energy.



Unlike the combustion of fossil fuels, the generation of energy in nuclear fusion is based on nuclear reactions. The nuclei fuse to form a new element, whereby the mass that is converted into energy is less than the sum of the initial masses according to Einstein's formula $E=mc^2$. Fusion experiments show that the required fuel density is extremely low, far lower than the density of air. As a result, nuclear fusion has no significant impact on the atmosphere, as neither hydrogen consumption nor helium emissions pollute the environment.

Nuclear fusion also produces waste. A fusion power plant produces radioactive waste because the high-energy neutrons generated during fusion activate the walls of the plasma vessel. The intensity and duration of this activation depend on the materials that the neutrons hit. However, compared to nuclear fission, which produces highly radioactive waste, nuclear fusion produces only a small amount of waste in the form of tritium and helium. It is important to note that the radiation from this fusion waste decreases much faster than that from highly radioactive waste from fission power plants. Researchers are working to develop materials that could further reduce activation and recycling technologies to reuse the components of a fusion reactor. Unlike fossil fuels and nuclear fission, which produce CO₂ emissions and hazardous radioactive waste, nuclear fusion generates neither CO₂ nor long-lasting radioactive waste.



Prof. em. Dr. Björn Klinge

President of the AVOLA DECLARATION ASSOCIATION

We are thrilled to announce that Prof. em. Dr. Björn Klinge has been elected as the association's first president. With his forward-looking leadership style and visionary thinking, he is set to take AVOLA further along its chosen path and take advantage of future opportunities. Congratulations. Björn, we look forward to an exciting journey ahead!

Björn Klinge received his DDS from Lund University (SWE), in 1977 and earned his Doctorate in Odontology in 1984, also from Lund University. In 1988 he became a recognized specialist in Periodontology by the Swedish National Board of Health and Welfare.

At Lund University, Björn was Associate Dean for dental education. In 1979-1980 he was a Visiting Junior Staff member at Loma Linda University (CA, USA).

He was Head of the Department of Experimental Surgical Research at the Faculty of Odontology in Malmö (SWE), from 1980-1994. He developed recognized models for research on tissue-integrated implants and periodontal regeneration during that period.

In 1994 Björn was appointed Professor and Chair of Periodontology at the Karolinska Institute in Stockholm by the Swedish Government. Soon after his arrival, he was appointed Dean and was responsible for the extensive development of the Dental Faculty, including education, research, and clinical activities. In 2012 he was recruited to Malmö University as the Dean for the Faculty of Odontology and also a Professor in Periodontology.

He is currently Professor emeritus in the Department of Dental Medicine, Division of Oral Disease at Karolinska Institutet, Stockholm (SWE), and Professor em., Faculty of Odontology, Malmö University (SWE). Björn is a Special Guest Professor at Instituto Universitario, Egas Moniz, Lisbon (POR). He has been a Scientific Advisor in Periodontology to the National Board of Health and Welfare in Sweden since 2002. 2019-2022 he was a member of the priority committee for the new Swedish National Guidelines in Dentistry.

In 2022, after 22 years of service, he left the role as Scientific Editor for the Journal of the Swedish Dental Association. He was Director of the National Clinical Research School in Odontology, funded by the Swedish National Research Council, educating 42 dentists for their PhD/Odont Dr degree. He has been an Expert Assessor in reviewing research at the universities in Bergen, Copenhagen, Dublin, Helsinki, Hong Kong, Oslo, and Zurich.

Professor Klinge is an Honorary Fellow at the Singapore Dental Hospital, an Honorary Professor at Ji-Lin University in P. R. China, an Honorary Doctor in

Odontology at the Faculty of Medicine in Turku/Åbo (FIN), and an Honorary member of the Swedish Dental Association. He is a former Board Member and Past President of the Scandinavian Society of Periodontology, and former President of the European Association for Osseointegration (EAO).

He is a Past President and Honorary Member of the Swedish Periodontal Association. In 2020 he was awarded the Karolinska Institute Silver Medal for outstanding services in promoting human health through research, education, and communication with the society. And in 2021 he was awarded the Gold Medal of Merit by the Swedish Dental Society. Since July 1, 2024, he is President of the AVOLA DECLARATION ASSOCIATION (Lucerne, Switzerland), an organization committed to health and humanity through prevention.

His more recent research interest and related publications mainly focus on the oral-systemic link, periimplantitis, and periodontal tissue regeneration. (Around 200 refereed scientific international publications available through PubMed, h-index 46, Web of Science). Björn has lectured extensively nationally and internationally by invitation to around 40 countries worldwide.

AVOLA News

Strategic Initiatives

How can we create an impact with an optimized effort in today's insecure world? To be successful means to focus! Therefore, we have developed a mid-term plan ("strategy") to create clarity about a few key topics to meet our purpose and to concentrate our limited resources to generate as much impact and influence as possible.

However, we have identified the following areas of interest relevant for our priority-setting. These areas are related to each other to pursue our purpose and leverage our impact.

PREVENTIVE HEALTHCARE
ORAL HEALTHCARE
NUTRITION, HEALTHY LIFESTYLE
BEHAVIORAL SCIENCES
HEALTH POLICIES, REGULATORY
& LEGAL AFFAIRS

It is relevant that AVOLA has a clear understanding of what the organization stands for, what type of projects it wishes to support and how it leverages its actions. Based on inputs by various members of the Board of Directors (BoD), this document offers guidance and helps to avoid confusion and redundancy in what we call "AVOLA's pilot phase" (period 2025-2030). If you wish to learn more about our strategic initiatives, visit our website www.avola.network.

AVOLA Junior Committee

In 2025, it is planned that we start first activities with the AVOLA Junior Committee. The basic idea is to offer young professionals a voice within the association, and to provide a platform enabling them to implement fresh ideas and share new perspectives, in order to raise the profile of

emerging talent and ensure AVOLA represents all age groups who can help us to put our mission into reality. If you are interested to join, please write to: msc@avola.network.



Winner of the
Jíří Sedelmayer Award 2024
Mário Rui Araújo

At the 1st AVOLA Symposium in Lucerne, Switzerland, in October 2024, Mário Rui Araújo will be honoured with the Sedelmayer AVOLA price for his commitment and achievements to date in the field of oral prevention. Mário Rui Araújo graduated in Dental Hygiene from the University of Lisbon in 1990 and obtained a Bachelor of Science in Dental Hygiene from the University of Washington in 1993. In 2002 he completed his Master's degree in Health Psychology at ISPA (Lisbon University Institute) and is currently a PhD student at the University of Lisbon (Department of Psychology). In his dissertation, he analyses different approaches and strategies to improve oral health behaviour.

Rui Araújo lives in Caldas da Rainha, Portugal, where he works as a clinical/behavioural dental hygienist. He is also a lecturer in behaviour change and communication skills and has given numerous guest lectures in various countries around the world and published several articles on the subject. He has been working as an oral health teacher since 1990. He is currently the director and lecturer of

the Dental Hygiene Programme at the Health School of the Polytechnic Institute of Portalegre. He has worked for the Portuguese government as project manager in the nationwide oral health promotion programme. In 2013, Portugal was honoured with the prestigious Sunstar World Dental Hygiene Award for the best oral health project in Cape Town (South Africa).

Events & Education

Each semester in 2025, two board of directors' meetings will be held at different venues in Europe.

Two expert meetings are being planned for 2025. Topics may include but are not limited to:

- Microplastics
- One Health
- Periodontal Diseases and Biofilm Mgt.
- Metabolic Health
- Healthy Lifestyle
- Non-Communicable Diseases
- Pediatric Health
- Behavior and Motivational Barriers
- Health Literacy
- Health Economics
- Environmental Influences
- Genetics
- Gut Health, Microbiome
- Success for the Oral-Systemic Practice
- etc.

The 2nd Oral-Systemic Health Connection Symposium will be held in 2026.

Details will be communicated in due time on www.avola.network.



THE ESSENCE

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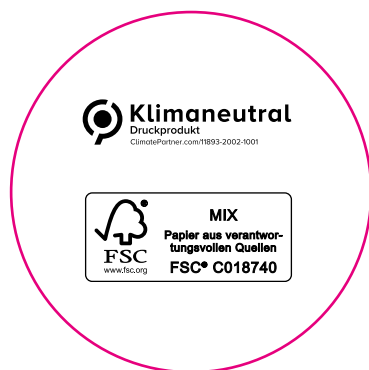
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